Berggruen
Institute

Hélène Mialet Remembers Stephen Hawking

Interview by Tobias Rees, Berggruen Institute Director, Transformations of the Human Program

Hélène Mialet has held post-docs at Oxford and Cambridge Universities and at the Max Planck Institute for the History of Science in Berlin, and positions at Cornell, Berkeley, Harvard, Davis, and York University, Toronto. She has worked on a range of topics some of which include Actor Network Theory; scientific and technological practice; situated and distributed cognition; human-machine interaction and post-humanism. She has written several books, most notably Hawking Incorporated: Stephen Hawking and The Anthropology of the Knowing Subject *(University of Chicago Press, 2012).*

You can read an abbreviated version of this article on the Berggruen Institute's website.

Tobias Rees: Helene, I would like to start by asking one question but in three different ways. Ready?

Hélène Mialet: Absolutely.

TR: The general question is: Who was Stephen Hawking? But I want to break it down to: Who was Stephen Hawking according to the dictionaries? Who was Hawking to the public? And who was he to you?

HM: The dictionary follows certain conventional criteria…

TR: …It lists the accomplishment of his works and mentions the key dates of his biography?

HM: Right. And I think it is fascinating to see how the same stories, the same landmarks, are used over and over again to talk about an individual. So, for the dictionary Stephen Hawking is a very famous scientist, who follows other very famous scientists. In the popular imagination, Hawking incarnates the genius and he also incarnates our common conception of the scientist as being just a pure brain. Hawking, perhaps more than anyone else, because of his disability, incarnates the idea that to do science you just have to have a beautiful mind and a big brain and you don't need anything else.

TR: Did Hawking partake in this discourse of the beautiful mind?

HM: He said very often that he was lucky to choose physics because everything was in his head, that's why he could do it. Which is interesting because, again what I am showing is that obviously you need a body, a different kind of body, a collective body in this context.

TR: And who was Hawking to you?

HM: Hawking was the opposite of this classical conception of the genius. Everything was not only in his mind but also extremely distributed around him. So the question therefore is not who Hawking was, but more where Hawking was.

TR: When did it first occur to you that a study of Hawking would perhaps allow you to question the popular conception of scientists as beautiful minds?

HM: I wrote a book called *L'entreprise créatrice,* which is an ethnographic study of innovation and creativity in a large organization. To be more precise, it is an ethnographic study of one individual in particular who was considered as being extremely creative. After I finished this book, I decided to pursue the themes of genius and creativity and to do a comparison. I received a postdoc at Cambridge in the Department of History and Philosophy of Science. Hawking was very close by and I thought he would be a fabulous case to study. On one side, I had studied someone completely unknown to the public, but working for a very well know company (Elf Aquitaine/Total). On the other, Hawking was extremely well known, but the corporation behind him was completely unknown. Very quickly, I abandoned the idea of doing a comparison realizing there was so much going on around Hawking that he would become my main focus. It is how I decided to study him and it took me two years to approach him in person.

Unlike my first study where I was embedded in a lab, I was not with Hawking all the time. Obviously I met him at different periods of my study, I spent time with him and was able to see him at work and at social gatherings. I had the opportunity to spend some time with him in Potsdam, he invited me to High Table in Cambridge, I even went to dance with him! So I saw him in his circles, which was important as well. I was not just looking at how he was working, but following him in different avenues. The project began in 1996 and I finished writing my book in 2010; it came out in 2012.

TR: I want to briefly get back to the question how come you were interested in studying Hawking. Bruno Latour was your supervisor. It's not difficult to recognize the importance of science especially for *L'entrepise creatrice,* but also for *Hawking Incorporated,* but there is a big difference between your work and Bruno's. Bruno, his Actor Network theory, has ultimately been a move away from the human as subject, thinker, as individual, as agent. His alternative networks were composed of human and non-human actants. Now, if one asks what concept of the human Bruno's work actually allows for, then it turns out that he has surprisingly little to say about that. This is precisely where your work comes in. In a way, you are rethinking many of the key terms of the classical, whiggish history and philosophy of science—the human, the individual, genius, thinking, subjectivity – in terms of Actor Network Theory (ANT). Is that a fair reading of your work?

HM: Absolutely. When I started this project it was just after my Ph.D., which I did with Bruno at the Ecole des Mines. This was also the 90s, when people were really creating and debating actor-network theory; what was so new about it was the idea of giving

agency to non-humans and to reintroducing their role in our social fabric. I was completely excited by this theory (or infra-theory), but I was also really shocked by the idea that the notions of the individual, the notion of charisma, cognition, subjectivity, all these notions were, so to speak, evacuated. These were all the questions I was interested in and my Ph.D. was really trying to think about creativity in practice and how to characterize a knowing subject in the making. And that's what I've done with Hawking as well. I tried again to engage with ANT by studying science in action, by following all the associations that constitute an entity, by trying to think about, and flesh out, this notion of translation, which is quite crucial in my work. But I was trying as well to recuperate this notion of the individual.

TR: Until the 1970s, the history of science was thought of in terms of individual human beings, almost all men, almost all solitary or self-sufficient minds, that were so incredibly smart that they would just come along and see the truth, which would then magically disseminate and everyone would see the light. Then, in the 70s, this approach to the history of science was coming under attack by various scholar who are today largely described as Science and Technology Studies. Instead of looking at science as a procession of ideas and truths, they looked at science as an activity or practice, one not at all confined to the laboratory. Bruno Latour, in the 1980s, gave this another push by including non-human actors. For example, writing about Louis Pasteur he suggested that it is quintessentially wrong to think of his work as the achievement of a single genius human. That would mean we would forget the many rabbits and chickens he worked with. And of course, above else, the microbes. Bruno made visible a whole network of things, human and non-human, and suggested that without understanding this whole network of human and non-human actors, we don't understand anything. One of the programmatic aims of this approach, later called "Actor Network Theory", was that everything that had to do with the human as a genius, as a free standing individual, as a subject, as a singled out entity set apart from the natural world was to be avoided. Helene's contribution, and this contribution cannot be overemphasized, has been to reinsert the human as a question into this ANT.

HM: Thank you for summarizing what I try to do in relation to actor-network theory. I was using the tools developed by actor-network theory to study precisely what the theory had constructed itself against and I was trying to push it in different directions.

TR: If you think back to the early days of the Hawking project, like when you first encountered him, when did you first 'see' him as a distributed collective?

HM: My book is constructed around this cinematographic idea of zooming in and out of my subject, of being far away or close to him. And contrary to the common conception that the closer you are to an individual the better you know him I was showing that the father I was from him the better I knew who he was, and the closer I was to him the father I seemed to be from him. In other words, when I started my research, I had access to him through newspapers and the press, as we all do, and so I had a sense that I knew who he was because, as I mentioned earlier, very often the same stories were recycled and written over and over again about him. But this conception broke down when I met him for the first

time in person. My first interview with him was very destabilizing, because I felt that I didn't know where he was anymore. I was not familiar with dealing with someone who was so disabled, so I didn't know how to communicate with him. Everything was mediated through the computer he was using at the time to communicate. I had to read the discourse written in front of him, he was not displaying any form of body language that is so useful to read to understand another person or a conversation. His assistants were coming in to take care of him, disturbing the interaction. The computer broke down. He used his synthetic voice. I was so unfamiliar with it that I didn't hear it (I only noticed it when I listened to my tape recorder afterward). So all of this contributed to this strange feeling of not knowing where he was anymore. Moreover, I realized that there was a complex collective around him—his assistants, the machines, his students, his colleagues, etc. He was delegating a lot of competencies to this collective because he was unable to do a lot of things by himself. And thus, he was making visible what we normally don't see, these different collectives that we all need, to a certain extent, to work and think and act. But it was becoming more visible with him. That became the theme of my book, which was to show again that we have this perception of the genius as something that is completely encapsulated in our mind, but what I was showing was that everything was extremely delegated and distributed around him and, again, I made visible these different collectives, what I call extended bodies that were so useful for him (and anyone else) to be able to work and communicate.

TR: Would it be fair to say that what interested you about Hawking is precisely that he, as an extreme case, allowed you to make visible a more general fact about humans—about science?

HM: Yes, this is precisely the point of my book: there is nothing specific about Hawking, there are certain specificities, but nothing specific in terms of being a scientist. Most of the time scientists are surrounded by students who do the calculations, who do the work, and especially when you are at his level. So to produce science you need a collective, you need a body, you need to be situated, but it's true for all of us, I think that's really a collective model that I am trying to apply in different settings. Hawking worked like a manager as well. A manager is someone who says 'yes' and 'no' at the right moment, but often a lot of assistants are doing the work around him or her. I think it's true for other domains. It could be applied to politics, art, industry. Again, if you start thinking of the individual as a collective, it opens a lot of doors and ways of thinking about different domains, how they are organized and what they value.

TR: The individual as a collective, this phrase has partly been misunderstood, I think. Some of the commentators on your work think that by questioning the individual—or by challenging the popular conception of Hawking as a beautiful mind—you want to critique science or that you are even anti-science, but that's not at all your point, right?

HM: Absolutely not, my point is to understand science in action, that's precisely what I'm doing. I'm interested in looking at how scientists work in practice. So my questions are: what kind of devices do they use, in what kind of situations do they perform their work,

how do they communicate, how do they build instruments, and so on and so forth. That's what I've done with Hawking. I've really tried to understand how was he able to produce theory or abstraction in practice. It's absolutely not anti-science, it's not anti-Hawking, or anti-genius. What I'm really showing again is how, by using the tools of anthropology and sociology of science, can we rethink and recuperate in these collective processes the role of the individual, the person, and of the self, how can we rethink these notions differently by studying them in practice.

TR: Would it be fair to say that one of the starting points for studying science in action is to avoid separating science out from everyday life? To me, one of the powerful effects of your work is that this distinction between life and science or science and society, where we put science on a pedestal, becomes impossible.

HM: Yes, I demystify science by making it tangible, but it is not anti-science; it's to show how science works. I am working against this distinction and this dichotomy we are trained to put into action when we talk about science as separate from society, and I'm looking at how this distinction is created and how it operates in the lab and beyond.

TR: I think this cannot be overemphasized, so to speak. Because when we talk about the effect of science on society we always imply, however indirectly, that on the one hand is science and on the other hand is society. But that is wrong, science is a product of society, science happens in society, and is social from the beginning.

HM: Yes, and it restructures society as well. Scientists are producing theories, objects, facts that are completely reconstructing and restructuring society as well. This is why it is impossible to use social explanations to explain science.

TR: I'm really curious, something we've never talked about is what concept of intelligence or thinking actually emerges from the human as a distributed subject. So, if Hawking is a distributed, decentered subject, his assistants, his nurses, the machines he works with, the diagrams, so who is thinking? Where is thinking occurring?

HM: Hawking is distributed and centered. The most difficult part was precisely to study "thinking" and precisely thinking in an abstract way. Because a lot of studies had been done to study laboratories but in fields like biology, etc., but the theoretical dimension of science was very difficult to deconstruct, so to speak. I think that's why this notion of how to produce abstraction was so interesting to me. I was trying to recuperate Hawking's body in this work of abstraction. Is "thinking" only the product of the mind? So what I've done is a close ethnographic study of how he worked with his assistants. I was trying to show that, of course, he was distributing the work around him, in very strategic ways, that is, he was deciding who should work on what, so on and so forth and his students were doing a lot of work. But Hawking was not just the product of this collective. I was attentive to the fact that his students kept saying that there was something very specific about him, he was able to take very interesting shortcuts, he had very strong intuitions. So my question was "what is

intuition in this context?" Again, I tried to see how he was working by manipulating images, it is what he used to say, he was able to think geometrically, and I discovered that he was able to manipulate images because in part he was able to look at diagrams. And again he couldn't draw diagrams by himself, so his assistants had to draw them for him. Therefore, I was trying to describe what it means to think visually by using images. What I show in my work is a form of exemplification, of course, some people are very good at thinking visually, so one more time, I was making visible what it means to think visually with the help of diagrams, but he was pushing this competence farther than others, because he had to retain in his mind these diagrams more than others because he couldn't draw them.

TR: Could one say maybe that with Hawking a new or different notion of thinking emerges? Of course there is an aspect where we are simply an interiority that reflects, but that doesn't happen in a sort of separate space, it happens through conversations, through bodies who are located in a room, like a simple thought collective of people who have conversations. Thereby, one could say that thinking, in addition to being an interiority is always kept into a network of humans and things and that thinking is sort of a reverberation in a network.

HM: Absolutely, you see that when you write as well. When you write you write with certain people or theories in mind so you are in conversation with other human beings or other theories and I think it's the case here as well. I think what I am offering is other ways of thinking about thinking and how it happens, but we need to explore more, obviously; it's a project that I need to develop, but it is also part of what I was trying to show.

TR: I totally agree. And you show it. One of the things that I find so fascinating about your work is how it corresponds with certain ideas of Gregory Bateson. For example, Bateson, in his *Steps to an Ecology of Mind* observes himself holding a stick with which he touched the ground and, thereby, feels the ground even though he doesn't actually himself touch the ground. For you and Bateson, thus, thinking is nothing that is limited to the mind or to the body, but extends to the stick to the ground and has an ecology, an ecology of mind.

HM: I think you are absolutely right to use Bateson and that's something I am thinking a lot about with my new project on Type 1 Diabetes as well, because it's all about machines as being extensions of the human, and animals as well, and other human beings are becoming an extension of ourselves. In the case of diabetes, parents obviously have to get involved in the management. So I am pursuing this question of the extension of the body in different ways to machines and animals and humans.

TR: I want to move from this different or alternative concept of thinking and intelligence to the question of artificial intelligence. I think it is fair to say that the concept of intelligence that AI is usually operating with is mostly an extremely individualized libertarian concept, it's an encapsulated concept of intelligence. Differently put, the distributed concept of intelligence that emerges from your work I don't really see in AI. I wonder if you have any thoughts on how to think of AI differently.

HM: You are right. I think we are still stuck in this paradigm, is a machine able to think assuming that thinking is the product of a mind, can we say that a machine thinks? But, if we start thinking about intelligence as a distributive process and interactions between machines and human beings, what does it do to our conception of AI? In a way what I describe with my ethnographic tools in the case of Hawking is a complex system that produces intelligence. It opens doors. Obviously, I haven't resolved this problem at all. But I think you are right it could move us in another direction.

TR: I find this really extremely intriguing. I have been struggling with what is intelligence or artificial intelligence for quite some time now and re-reading your work, I just suddenly was flooded by associations. When we imagine artificial intelligence and then we imagine intelligence from the perspective of the machine as a humanlike or subject centric actor, when you take your work or the work of Bateson, then thinking happens in an ecology. And for Bateson, ecology was literal, he meant nature and information networks. So, now one could think about AI in terms of an ecology of, an integrated system, and it doesn't even have to be a system, it can be an assemblage. Then the question of the natural and the artificial kind of dissipates, it's becoming relatively insignificant, right?

HM: I think to think about ecology is a very good way of thinking about it. And I agree with you, it destabilizes all these dichotomies we always use to think about intelligence and the distinction between the natural and the artificial start to dissipate. I'm currently working in the case of my new project on dogs' cognition.

TR: Would it be fair to say that from the earliest homo species onward, humans were always distributed selves and that tool making was a first step in expanding ourselves?

HM: Absolutely, we've always been like that. But more than ever. And there is a tension in my work that I want to keep that is again what I call distributed and centered, what I showed is that the one who was the most distributed was the most singular in a way. So that's the paradox. And the reason I am saying that is because you are right, we've always been distributed in different ways, we are also centered in different ways, so I think all these questions I am trying to open for further studies. I don't want to close the discussion by giving a definitive answer, I'm trying to open a field of reflection by integrating this notion of ecology, of collective, of distribution, but always trying to keep in mind, how can we rethink the human in this kind of context as well.

TR: One more question in that respect, so on the one hand there is a continuity from the earliest use tools of humans to the present, and as Stephen Hawking allows to make this visible precisely because he is such an extreme case, and here I am curious if you think the rise of computers or AI makes a qualitative difference in the history of this distributed concept of the human or human evolution simply because before computers, this becomes nicely clear in Bruno, humans even though they are just part of the network are kind of the special part of the network. They are usually the kind of condensation point. And computers are sort of another kind of intelligent condensation point possibly, so I

wonder if that makes any qualitative difference or not.

HM: Obviously there are specificities, that's the beauty of thinking about all these elements. Every element has a specificity, again a table is not a computer, obviously. It comes up with certain specificities that can be reconfigured depending on what they are connected to as well. So you have to take into account these different specificities. But again, it's difficult to talk about in the abstract, you have to study in practice what is happening today and I think we need to understand how we interact with machines and all the questions that are emerging from this interaction. The other thing is, obviously, with Hawking, to go back to him, what is very intriguing is that he was the first one who used the devices that we all use today with our cell phone or iPad, which is all these programs that complete our words, our sentences, and so on. So he was completely connected to machines from early on, 20 years before us, so I think it is interesting to see that my study was a kind of archeology of what we are all becoming in a way constantly connected to machines. That is something we need to study in practice, I think.

TR: Is your new work on diabetes revolving around related lines?

HM: Yes, I am trying to pursue these questions. My research is more in the domain of medical anthropology. In my own vocabulary, what I try to describe and flesh out is this notion of a distributed subject. What does it mean for an individual to delegate all his or her competencies to machines and human beings. And so I am interested in Type 1 Diabetes because to be able to manage your disease you have to trust and rely on a lot of collectives composed of parents, machines, and animals. Now, I'm studying how dogs are trained to recognize hypoglycemia. So, again, I'm pursuing this notion of distributed person or distributed agency taking into account different elements that abide with different regime of truth and exactitude and care.