



Sarah Fdili Alaoui: Artist-Dance Maker

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Sarah Fdili Aloui grew up in Morocco where she trained as a dancer in ballet and later in contemporary dance through which she discovered improvisation. Unusually she was also a gifted student in mathematics, a combination of movement and number that was to have a profound influence on her subsequent direction in education and life. As she studied for her master's degree in applied mathematics she engaged in yoga and somatic practices but it was not until she did her PhD¹ that these parallel paths came together. Discovering the intersection of dance with mathematics and computing through movement analysis was a revelatory moment when her creative and analytical talents found a natural home. This was the start of an extraordinary trajectory in research and practice that centres on movement qualities and embodied interaction. In Paris, she worked with Fréd Bevilacqua and Christian Jacquemin whose guidance was important in her computer science research. Sarah went on to extend her work on merging choreography and interactive technology at the School of Interactive Arts and Technology at Simon Fraser University in Vancouver. Here, in collaboration with other dancers, she began experimenting in earnest as she pursued her ongoing fascination with choreographic processes and somatic practices that explore intimate body-mind experiences. A key challenge for her resides in how to articulate and share the knowledge that emerges from 'felt movement'. Achieving an understanding of the relationship between the sensory body and the cognitive mind is explored through creating opportunities for observing movement both of the self and of others². A way of accessing expertise in movement is Laban Movement Analysis (LMA) which is used to capture and codify qualities that can be integrated into interactive technology³. She is currently assistant professor at LRI-Université Paris-Sud and the INRIA *Exsitu* research team, teaches at a Dance conservatory in Paris and a dance collective on productions e.g. Skin⁴, and 'Radical Choreographic Object'⁵ and 'Ergonomics'⁶ a piece in which she is a researcher and dancer.



Figure 1: "RCO, Interactive Participatory Dance piece by Sarah Fdili Alaoui and Jean-Marc Matos" ©Fabien Leprieult

In her interview, Sarah reflects on how digital technology contributes to her understanding of her reflective embodied practices. She also describes how this is an integral part of her practice related research, an area that is discussed in *Part 6 Reflection through Research* to follow.

Interview

Q: Could you say something about the way a new project begins, takes hold and starts to develop into something concrete?

S: I start sketching ideas, things I have put on paper from my readings, what I have seen, felt or experienced. The reason why I call myself an artist is because a lot of what I do is for the creative process. But on the way knowledge is emerging and that knowledge has an academic value and a creative value. I like to give both an importance.

Q: Are the tools answers to your questions or are they ways of provoking your questions?

S: They are ways of provoking my questions and ways of provoking a certain response or an opportunity for an exploration ... And then I use the somatic practice, which is an additional set of tools for observation, to be attuned to one another, to train your kinaesthetic empathy, to listen to what's going on in the body and how you observe it, how you make sense of it, how you translate it ... There have been various tools I have developed. Most of them are whole patches filled with programs and mappings. I can't say it was completely mine because some of it you grab from your colleague who has developed it. It raises a question of what belongs to who, which is a very interesting question in Computer Science, but also in Dance, because I borrow some of the techniques from choreographers with whom I train and different somatic practices just as much as I borrow programs and algorithms I find that I combine together to do the whole work.

I've worked a lot with sound and image as part of the output that makes the dramaturgy of the piece and with whole body interaction so a lot of the tools I used were for motion capture. I recently worked a lot with EMGs for muscle activity⁷ and IMUs for acceleration⁸ as I started to be more interested in the Laban Effort qualities⁹ that can be accessed via the forcefulness and the sense of acceleration of the movement (among others). I would say I have a collection of tools and I open up that box and choose which tool goes with what. For example, my last piece, which I choreographed recently called 'Skin' is perhaps too complex because I have chosen to use three different types of tools or instruments or interactions, one of which is machine learning for movement recognition. We filmed the whole piece in a remote house in Marseille in the south of France. There is a discourse or an interaction between what the dancers are doing on stage and the film that is triggered through the interaction and via a machine-learning algorithm. I am using Myos¹⁰ for muscle activity but also proximity sensors and heart beat sensors. The muscle activity is recognized by the machine learning module and that triggers the corresponding videos in real time on stage. There is another part where the heartbeat is interacting with the sound rhythm - the tempo of the music for each of the dancers increases or decreases as their activity increases/decreases.

Q: What sort of questions are you asking when creating a piece with tools for interaction?

S: It's called 'Skin' because it's about that home of the self and how the skin is the border of that home of the self and how what is given to see is always what is outside of that. So, what can we capture from the inside of the 'home' and what intimacy does it allow for? - sensuality for example. And how much of that do we allow ourselves to show? And the reason why we are filming this whole piece in a house in Marseille is a metaphor of that house. There are two female dancers, very beautiful dancers that are walking us through different scenes and the whole piece is filmed as a film with different scenes. There is a narrative around it where you discover different parts of their lives, of their beings as they are on stage and the technology mediates the discovery throughout the whole piece.

Q: You seem to be putting into practice the philosophical notion that our minds extend into our bodies and vice versa, the body extends into the mind. Can you say more about how you see that?

S: There are multiple ways I use phenomenology or embodiment. One way is the methodology in which you discover through the body - the body is part of the knowledge. I constantly refer to that knowledge as knowledge when I am writing even in my academic work. I no longer or very rarely do controlled experiments, controlling different parameters and trying to get a person to show you whether they are faster or more accurate etc. In all of the work I do there is constantly the question of how does the body respond and how do we make sense of it from a cognitive and embodied way.

People never know they are embodied beings so I start by giving an example –do you articulate how you ride a bike, or how you walk or how you sit. And then it gets people to think, “Oh, have I ever thought about how I am walking or how I am sitting?” Then they understand that this is an embodied process that has been completely integrated and is not articulated. If I add a technology, if I give you a tool, a hammer, are you thinking about the hammer while you are hammering that nail? No you are not because that hammer has become an extension of your hand. And that nail, you know exactly how to move that shoulder and that elbow and that hand to nail that nail into the wall with impressive skills that your body completely understands. Our paradigm is that these tools might be digital, these technologies might be beyond that physical hammer but they work with the same kind of principles. These are the principles I’m interested in.

Q: You give a nice example of the kind of knowledge you mean above. Could you also give an example of similar knowledge that comes from your research in embodied interaction – or point me to a paper where it is described?

S: In my research on embodied interaction, technology is considered as an extension of the body and the integration of the technology as a support or a partner for moving is what I study and write about. We have reflected on this with my co-authors in many papers¹¹.

The complexity with these systems is extremely interesting I find. You can maybe predict what one of the particles does and then you add another particle and the complexity increases even more and with more numbers it becomes a complex system even if you want to give it certain physical qualities, there’s always a certain amount of unpredictability and uncertainty. I think a system that brings opportunities and unpredictability is more interesting for a dancer than a system that allows you only to control as if you would have a remote control. That’s very limiting.

The embodied cognition part is that I am always curious about how we integrate things in our body and how they make sense and how they start to be choreographic opportunities. I am attempting to do that by learning different techniques: the ‘experience explicitation’¹² technique is part of my attempt to reconcile that and to get to the richness of what is felt, what is experienced and make an account of that and to build an academic knowledge as well.

Q: What place does reflection have in your work?

S: Reflection is a big part of it. There are times when you reflect on the outcome of an iteration, and you have to throw everything out. You have to accept to not get attached to anything. And the work itself is what matters, so in the last piece SKIN, a student spent six months developing a hardware for capturing touch and heartbeat, at the end I throw it away because it wasn’t as reliable as I needed and used mobile phones instead. It took me three days to make that decision, but eventually I did. Reflection was what helped with that, keeping an eye on where you are going, re-thinking the whole and not attaching to the details and definitely not to the technique...a lot of the practitioners we were working with were dealing with the struggle of not being able to articulate and make sense of what they felt in

order for it to be operationalised from a design perspective. I think that is the struggle for the whole embodied design community especially if you are doing embodied design with a somatic practice...you start to struggle: what is it that I felt is the first question? And how is this a design opportunity?

Q: I see you as someone who is continually reflecting through the body, through embodied practices: does that sum up accurately what you do?

S: The work of Varela¹³ has allowed it to shift a little bit. The fact that you are claiming you have something to learn from your body is a big claim. I believe in this 100 % and that's what I am doing. It's the reason why I go to the studio. And there are some great challenges in how much of this knowledge can we make available and how do we make it valid? How can we perceive it as a valid type of knowledge? And that's where the reflection becomes really important; beyond your own practice it becomes knowledge you can share. I think you need a simple connection to the body. The easiest way is to have an embodied practice. I would say painting can be an embodied practice, music as well. It could be disembodied if consciousness is not put into that. I would say that the difference is that there is a reflective embodied practice. We are all embodied beings, we all have certain tools and instruments that we deal with and use with good mastery- the musician, the carpenter, the writer, etc but what I am talking about is the reflective part. Thank you for bringing that up because reflective practice might be missing in the musician who doesn't actually articulate what happens with the body. That might be something missing in the researcher who is doing embodied interaction; that might be sometimes missing even in a dancer who is extremely technical and good physically but lacks the reflection part.

Somatic practices allow us to be aware, be conscious of those processes and articulate these experiences. It nourishes this process and trains you to change your patterns, whatever you need. I think this path is also a path of knowing oneself, digging deep into our choices and what motivate them. The body is a great place to do that because the body never lies!

Q: Can you say something about the collaborations you are involved?

My collaborations are diverse but they belong to that realm of dance and science. On the other hand, my teaching in the Conservatory is also taken as experimentation as I bring in technology for the students to dance with. It is part of a research project where we are trying to understand how the technology can be integrated in a dance learning process. So these are the types of projects I'm dealing with and yet all of them are collaborative.

There is the piece being performed at MOCO 2017 with Yves Candau and Jules Françoise¹⁴: we are all co-creating it and Jules Françoise has been developing the software. They have been collaborators for a long time. I am also collaborating with people still at IRCAM where I did my PhD, and still collaborating a little with Thecla Schiphorst and Jean Marc Matos a choreographer based in Toulouse: we are co-creating the piece 'Radical Choreographic Object'. I am also collaborating with Wendy Mackay as part of the supervision of two PhD students working between choreography and movement-based research and HCI theory.

I was collaborating with renown choreographers and professional dancers. The intersection at that point was from the perspective of the knowledge I had of dance. I was already starting to be interested in how much I could get to know of the work of the choreographers I was collaborating with that can inform my work as a computer scientist.

What I was doing that was just the start of integrating my practice into my work was to take workshops with the choreographers I was working with and experience it with my own body, what they were talking about, the qualities, the vocabulary they'd developed. And from that understanding, trying to build models that would represent this embodied knowledge. My supervisors at that time felt 'Yes, that's great if that is accessible to you, because it's not

accessible to us, that's just great that's just positive. So that was the beginning of my practice nourishing my research.

Q: This must have been very exciting for you to find an environment like that was attuned to your desire to bring those disciplines together.

S: Exactly. ...at the School of Interactive Arts and Technology, there was this political will to bring people together either from different disciplines or fostering work from people that represent in themselves a mixture of inter-disciplinarity in their own works. I felt in that context there was a very fertile and safe environment to explore and that was valued that was a real academic contribution.

Q: When you think about the disciplines that you hold in yourself, does one have primacy over the other or are they equal partners?

S: I would say they are both equal. They come together. The dance practice for me is very important: without it nothing happens.

Q: Is the partnering with the technologies a vital part of your creative exploration?

S: They are media, instruments, tools- they are partners that have their own decision-making process. It is very strong in one of the works I collaborated in called 'Double Skin Double Mind'¹⁵ where I used physical simulation and particle systems to represent abstractly what these movement qualities are in the body. Such an interactive feedback informs the dancer on her movement qualities rather than directly reacting to the postures or shapes or trajectories of her body while having their own behaviour and revealing some unpredictability. This type of relationship is perceived by the dancers as a partnership rather than a control which is very valuable in dance learning and performance.

I have also used this type of interactive systems in a large-scale installation called 'A Light Touch'¹⁶. It is based on a similar apparatus but displays a massive number of light particles. In this installation, participants can interact with the particle system projected on a rear surface using their hand movement qualities. The particles are made of small lights that have a physical behaviour that responds to the participant's expressive hand movement qualities. The visuals are responsive and have self-agency. They as well create an environment that seems to be alive in its own way. It was extremely impressive how much they were perceived as expressive those particle systems even if they didn't represent a body, they didn't represent anything concrete you could actually refer to but their dynamic and their behaviour was perceived as something that is physical and human related to movement qualities in dance. And that system, because of the physics behind it is responsible but at the same time it has its own dynamic, its own qualities and is also perceived as its own thing. So, people say it's responsive but also alive. In that sense, we start to talk about partners because partners don't only mimic what you are doing or tell you something about what you are doing but give you an opportunity by making choices.

So yes, I love collaborating. I think it's a major motivation for me and it nourishes my practice a lot. As much as I love learning from other people's practice, I have to say that I am constantly training myself with people with more experience than I have in the field either of dance or interaction design, art and science... Last week I was in Deborah Hay's workshop and learnt an amazing amount of knowledge. She had been working in dance practice for over 50 years¹⁷ non-stop. It was fabulous to be around this person and absorb as much as possible. She nourished my practice straightaway in one week!

I collaborate with people working in machine learning, mostly for movement recognition that allowed me to do various things. In pedagogy to provide feedback to dancers on what they do; or in performances where we use interactive sonification to reveal certain aspects of what's going on in the body of the dancers that were not seen or were hidden. There are always good coincidences, where you meet someone who has the same interest as you at that time. You

start talking and usually plan to go to the studio and start giving an idea some kind of form. Then the rest flows until you start feeling that it looks close. But it never actually does, so you have to stop at some point and show it. And reiterate again and stop and show it. I am usually faithful, I keep working with people I started working with.

Collaboration is not always easy, especially when you work with the body and with technologies, because the body is so much more direct, and so much more intelligent. The technology never follows and is always somehow a place of frustrations. But we persist. I work with people that want to persist with me!



Figure 2: SKIN, Interactive Dance piece by Sarah Fdili Alaoui and Tamara Erde

¹ Alaoui,S.F. (2012).

² Alaoui et al (2015).

³ Alaoui et al (2017).

⁴ Skin: <http://saralaoui.com/2016/02/res-p-i-r/>

⁵ Radical Choreographic Object: <http://saralaoui.com/2017/02/radical-choreographic-object/>

⁶ Ergonomics: <http://saralaoui.com/2017/02/ergonomics/>

⁷ EMG: Electromyography is an electro-diagnostic medicine technique for evaluating and recording the electrical activity produced by skeletal muscles, performed with an electro-myograph instrument

⁸ IMU: Inertial Measurement Unit- an electronic device that measures a body's force and magnetic field surrounding the body, using accelerometers sometimes magnetometers.

⁹ Laban human movement consists of four parts: Direction, Weight, Speed, Flow each with two elements combined as Eight Efforts: <https://www.theatrefolk.com/blog/the-eight-efforts-laban-movement/>

¹⁰ Myos: <https://www.myo.com>

¹¹ Alaoui et al (2013) ; Françoise et al. (2017).

¹² Vermersch, P. (2003). L'entretien d'explication. (Quatrième édition enrichie d'un glossaire) Issyles-Moulineaux : ESF Éditeur.

¹³ Varela et al built on Merleau-Ponty's work to develop a model of cognition as "embodied action", a process they call "enactive" (Varela et al., 1991)

¹⁴ Performance 'still, moving' with Yves Candau and Jules Françoise MOCO2017: <http://moco17.movementcomputing.org/index.php/evening-performance/>

¹⁵ Double Skin Double Mind: <http://saralaoui.com/2015/03/double-skin-double-mind/>

¹⁶ A Light Touch: <http://saralaoui.com/2015/03/a-light-touch/>

¹⁷ Deborah Hay, not as Deborah Hay | A documentary by Ellen Bromberg, an intimate presentation of seminal Judson Church dance artist Deborah Hay, discussing and performing her work. The video footage for this film was recorded in 2006 <http://dance-tech.tv/videos/deborah-hay/>