



Joocheon Lee

Hideyuki Hara

# SHALL WE TALK?

## How technological innovation will elevate the future

Leading the development of Wacom's core technologies—electromagnetic resonance (EMR<sup>®</sup>) and active electrostatic (Active ES<sup>®</sup>)—are Joocheon Lee and Hideyuki Hara. The two talented engineers agree: Wacom is a technology company. Their words reveal their pride in their work, for it is engineers like themselves who are responsible for paving the way to the future—not through business acumen but through a focus on technology.



Wacom Linear Pen technology was first incorporated into the pen designed for the FMV LOOX from Fujitsu Client Computing—a Wacom Technology Solution customer. The sharp nib makes it easy to see the exact location the pen is touching. This pen works on Active ES<sup>®</sup>.

The Wacom Pro Pen 3 was developed in tandem with the Wacom<sup>®</sup> Cintiq<sup>®</sup> Pro 27 tablet. The pen greatly enhances the drawing experience, with detachable parts that can be replaced to suit the user's work style. This means customizable grip thickness and center of balance, as well as the option to have a side switch or not—and any combination works. This pen works on EMR.

### A fondness for science leads to a career at Wacom

— Let's begin with you, Mr. Lee. Could you tell us a bit about your background?

**Lee** I was born and raised in the Gangnam District of Seoul up until university. I'd gotten a bit tired of the hustle and bustle of Seoul as a teenager, so I decided to go to a technical university away from Seoul, where I majored in materials science.

— Did you always enjoy the hard sciences?

**Lee** I took all kinds of lessons when I was little, like painting and piano, but mathematics suited me best. So, naturally, I chose a university of science.

— How did you come to join Wacom?

**Lee** I used to work at Samsung, but one day I realized that I had already done everything that I wanted to do there. Just when I was thinking that I wanted to work in a new environment where I could delve deeper into unknown areas as an engineer, Mr. Ide—who I already knew—reached out to me. I took my time to think everything through, but eventually I decided to come to Japan because I was intrigued by the possibilities that lay before me.

— Mr. Hara, did you also like science as a child?

**Hara** I grew up in the town of Taisha in Shimane Prefecture, Japan, a short

5-minute walk from the famous Izumo Taisha Shrine. I've always hated being told what to do [Laughs.], so I never took part in any after-school lessons or clubs. Instead, I would read books, catch insects outside, and spend a lot of time doing crafts. I liked math and science class in school. I was fascinated by a scientific comic book on the theory of relativity, so I ended up going on to graduate school and devoting myself to the research of theoretical physics.

— Why did you leave science behind to join Wacom?

**Hara** Although I did like working as a scientist, I have loved creating things since I was a kid. I think that somewhere deep inside, I had a pent-up desire to create something. Also, when my parents bought me my first computer in high school, I was so excited about being able to draw digitally that I got myself a pen tablet, which happened to be a Bamboo tablet from Wacom. I remembered that tablet when I was applying for jobs, which eventually led to joining Wacom. That was in 2008, so I have been with the company for 15 years.

### How Active ES works

— Mr. Hara, you lead the development of Active ES, Wacom's active electrostatic technology. Could you describe how it works?

**Hara** In case of electromagnetic resonance (EMR), the development is led by Mr. Lee here. In EMR, a magnetic field emitted from the sensor





below an LCD screen generates an inductive current in a pen's coil, which is used to transmit information such as the position, tilt, and pressure of the pen. That means that the pen does not need a battery. Active ES technology, on the other hand, requires a battery-powered pen. Static electricity from the tip of the pen is used to transmit information on the pen's position, tilt, and pressure. The benefit of EMR is that the pen doesn't require any batteries, but you do need sensors behind the liquid crystals to generate the magnetic field. Meanwhile, Active ES eliminates the need for dedicated sensors for the pen.

—What are the benefits of Active ES?

**Hara** One notable feature is its versatility. Touchscreens have become commonplace since the advent of smartphones, even in computers. If you're going to incorporate touch sensors anyway, it's fairly simple to design a system that uses those sensors to acquire positional information about the tip of a pen. That's why many PC manufacturers have incorporated Active ES. In fact, much of our Active ES technology is sold to original equipment manufacturers (OEMs) for PCs and tablets.

—What are the advantages of Active ES over other similar technologies?

**Hara** The protocol name of a digital pen is just a name. Think about

languages—the ability to speak Chinese or German, for example, doesn't confer any specific advantage in and of itself; in the same way, there is no great advantage or disadvantage to the protocol itself. What is important is not the kind of signal that's emitted from the pen but rather the kind of performance we achieve. That is why it is so important for Wacom to focus on how far we can push this technology and to take responsibility for it, which I believe is our strength as a company.

—Since Active ES is a relatively versatile technology, could it be adopted in areas that are not yet digitalized?

**Hara** Absolutely. Since an Active ES system hinges on a touch sensor and a controller, it is easy to spread usages by adapting to different protocols. It is also relatively easy to control risk in terms of manufacturing and the supply of parts. As such, it is suitable for applications in education and other fields relating to social infrastructure.

### The future of EMR

—Mr. Lee, where do you want to take Wacom's proprietary EMR technology going forward?

**Lee** Wacom has been developing EMR technologies since the company's founding. As Mr. Hara said, use of digital pen technology is growing rapidly. So how can we draw on Wacom's unique strengths to enrich the world of EMR in a way that is unique to Wacom? To go even

further, how can we take this matured technology to the future? That is my focus now. My immediate challenge is to consider how to build a business model that leverages the technological value of the professional pen to provide solutions based on EMR technology.

Since I am a technologist, I don't think like a businessman trying to reach new markets; instead, I approach challenges first from the technology and then integrate the technology into the business side.

—Business and market development is important, but technological innovation is even more important to you to create new experiences.

**Lee** Exactly. Since Wacom is a technology company, I think it is vital for us to create value by making the most of the technologies that only we have at our disposal. And that is exactly what I wanted to do when I joined this company! I think we will find our next big story—the next innovation in Wacom pen—through this process. Once we engineers produce results, I am sure that the business side of the company will follow through.

**Hara** I fully agree. If you're in an environment in which people do not or cannot challenge themselves, talented engineers will become frustrated and quit. But if you build a corporate culture that pushes people, they will grow and will naturally want to keep working here.

—What would you say is the philosophy of "Wacom-ism" shared by the entire engineering team? For example, big-picture thinking, logic, and intuition are all necessary skills for creative thinking and technological innovation.

**Hara** I think it is important to encourage people who can see the big picture to express their opinions and incorporate them into development. I myself am an engineer, so others probably see me as a very logical person. I keep a technology roadmap in my mind, and I'm inclined to assign team members to the roles where they can best use their individual talents to work towards our destination.

—What about you, Mr. Lee? What do you value as an engineer?

**Lee** I think a broad perspective is

key. You can't think just as a Wacom engineer or just about the Wacom device you're working on. You have to mobilize all of your knowledge and senses to search and solve problems—even if it means defying practice and history—and in so doing challenge yourself to reach a level that you can be satisfied with. I think this kind of mindset is necessary particularly for young engineers, in order to grow.

—You mentioned young engineers—what do you think of Wacom's?

**Lee** When I first started here, I was worried because everyone was so quiet. But when I began making an actual effort to speak with them, I was pleased to see that there are in fact a lot of good engineers here who have a lot of grit. They all have their own skills and passions. I'm sure that the next person to lead Wacom is already among them.

### Is there a future for drawing / writing

—Lastly, what do you think will be the future role of drawing / writing with a pen?

**Hara** Considering that the Industrial Revolution ended in the 1860s, laptop computers appeared around 1990, and smartphones appeared in the early 2000s, it is clear that human science and technology has made tremendous progress in just the past 150 years. I have no doubt that we will soon see very small devices with as much processing power as a present-day PC. Technology will continue making things more convenient and lead to less hassle. However, while things have become easier and more convenient in today's society, people are feeling tired, too. It's exhausting to have access to so much information at any given time, and we've become restless—we feel that we always have to be doing something, all of the time.

In the world we live in, I think that the acts of drawing / writing are extremely important to help us organize our thoughts. As technology continues to drive efficiency, I think there will come a time when drawing / writing will be valued again. Our image of the digital world is one of immediacy, with no room for errors or flexibility, but I think this may reverse to a certain degree. We may see a comeback

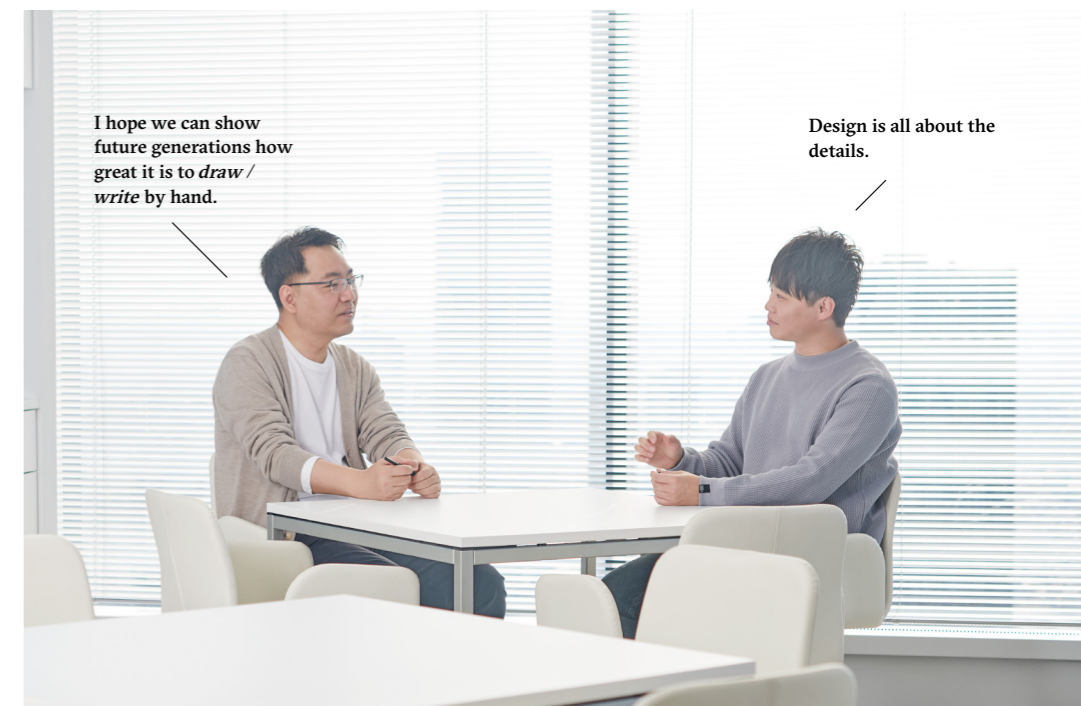
of inconvenient or perplexing experiences that make us think, "What does it mean?"

Gaining a newfound appreciation for drawing / writing combined with digital technology—could considerably enrich our lives. I believe that it is Wacom's responsibility to refine technologies to help facilitate this scenario.

—What are your thoughts, Mr. Lee?

**Lee** I think that what awaits us is a connected society, one in which all information and all devices are connected. Devices may be controlled by artificial intelligence (AI), and people may switch to using voice input to issue commands. It's not surprising that people worry about what will happen to drawing / writing with a pen.

However, I don't think that AI will be able to fully replace human ingenuity. That's why I want to explore how we at Wacom can support people's creativity and imagination. Going forward, I believe that Wacom's engineers must tackle such issues as they try to envision the next digital pen and do the work to make it happen.



I hope we can show future generations how great it is to draw / write by hand.

Design is all about the details.

SHALL WE TALK ?