**Testimony of**

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Testimony before the

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on

# *Intellectual Property – Driver of Innovation: Making Our Lives Healthier, Safer, and more Productive*

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**Introduction**

Chairman Grassley, Ranking Member Feinstein, and Members of the Committee, thank you for the invitation to appear today. This is a great honor, and I am humbled by the opportunity to tell you my story.

My name is Conor Madigan and I am the Chief Operating Officer and President of Kateeva, a company I co-founded in 2008. I am trained as a Physicist and Electrical Engineer, and I started working in 1998 on the technologies that I would eventually spin out into Kateeva when I was a Sophomore at Princeton University. I later continued studying these technologies at the Massachusetts Institute of Technology, where I earned my Masters and Ph.D. degrees and then worked as a post-doctoral research scientist. Today Kateeva supplies products derived from those original technologies to some of the largest electronics manufacturers in the world. And in my present role I oversee Kateeva's R&D, Product Development, Sales, Service, Marketing, Manufacturing, and Operations.

I have also, since day 1, directly managed our Intellectual Property (IP) program, and I am here today to talk about the importance of Intellectual Property as a driver of innovation.

**Technology Innovation and the Kateeva Business**

Let me step back, though, and describe what we do at Kateeva, and how I came to found Kateeva in the first place.

In 1998 I started working on using inkjet printing to manufacture a kind of electronic display called Organic Light Emitting Diode, or OLED. OLED technology at the time was thought to be the "next" display technology after Liquid Crystal Display or LCD, promising better brightness, color, contrast, switching speed, and power efficiency. There were even hints at that time that OLED displays could be made on sheets of plastic that could curve, roll, and even fold during operation. In short, OLED looked like an ideal display technology with limitless application.

But manufacturing OLEDs was very difficult, and in particular, existing equipment technology was struggling with how to form the patterned coatings of organic compounds needed in many OLED fabrication steps. My sophomore year advisor at Princeton thought one way to solve this problem was to use inkjet printing to form those coatings. The idea was that if inkjet printers can do a good job printing pigments onto paper in a photo printer they might also be good at depositing coatings of OLED materials onto display surfaces, if we could just make the right ink and design a sufficiently precise printer. And printing would have the inherent advantage of being relatively inexpensive (since printers are not as expensive as typical electronics manufacturing equipment) and relatively easy to scale up to large sizes (since there were already 3 m wide poster printers in the market.) To be honest, this was just as crazy an idea as it sounds, but one of things that has made the U.S. such an innovation powerhouse for such a long time is its well-resourced academic research community full of both crazy ideas and

talented people. Over the subsequent 10 years, initially at Princeton and later at the MIT, I had the great honor to work with an incredible number of brilliant scientists and engineers surrounded by all of the resources we needed to keep driving the idea of OLED printing forward.

In 2008 my colleagues and I founded Kateeva based on some of the technologies we had developed at MIT, and after working through my then-life-savings of roughly $50K we were fortunate enough to persuade two venture capital funds, Spark Capital and Sigma Partners, to invest. Their initial investment kicked our development efforts into high gear, but this was not an obviously smart investment. For decades, companies have been trying to use inkjet printing to manufacture electronics with very little success. When Kateeva started, nearly every company working in the field had declared inkjet a failed technology for high end electronics manufacturing, instead seeing it only as a niche concept with very few real-world applications. But we, and our original investors, were convinced both that OLED technology would revolutionize the display industry and inkjet printing would be an essential ingredient.

Today, Kateeva's inkjet printing systems have made it possible for the world's largest electronics manufacturers to cost effectively produce OLED screens on thin plastic sheets that curve, roll, and fold. To provide a sense of scale, our product typically has a footprint of 2000 square feet and a weight of 50 tons, is composed of more than 50,000 precision parts, and is the result of more than 500 man-years of technology innovation and product development. Already the OLED screens made on our equipment are being integrated into the most popular cell phones. And recently prototype devices have even emerged which utilize screens that roll or fold up when not in use, so you can have a tablet sized display that collapses into a pocket sized device.

**Kateeva's Domestic and Global Impact**

Kateeva has established a global footprint, serving the major OLED manufacturers (which are all located in Asia, and specifically in South Korea, China, Taiwan, and Japan) from our headquarters in Newark, California (in the Bay Area). We employ more than 300 full time staff, of which roughly 250 are based in our Newark facility. In addition to our R&D and Product Development, we also do the majority of our manufacturing in Newark, demonstrating that high tech domestic manufacturing is not only possible but under the right circumstances is even be competitively advantageous.

We are now known worldwide as the leading company in inkjet for OLED manufacturing and we are growing rapidly as the OLED wave takes off. We have roughly doubled in size over each of the last two years, and anticipate strong continued growth going forward.

We are working closely with our customers to help them manufacture cost effectively even more extraordinary products, and look forward to a future in which cost effective OLED screens

are available for cell phones that fold, cars with beautiful electronic dashboards that follow the curves of the interior, and TV's so lightweight and paper-thin that they can be held on the wall with magnets. Already we estimate that there are a 100M devices out in the world that use screens produced on our equipment, and we see that number rising to 1B devices in the near future. Our vision now is to help our customers supply to the entire world displays that are less expensive, more vibrant, and more beautiful because of Kateeva equipment.

**Intellectual Property as the Key Driver of Kateeva's Innovation**

Having set up the context of Kateeva's business, and how it started, I want to come back to the topic of intellectual property. For most of the time that I was in academia, I was not particularly interested in intellectual property, and the innovations my colleagues and I developed were driven almost entirely by the desire to discover new ideas and publish papers about them. But there is fundamentally a limit to how far one can take an idea in that environment. As great as the resources are at places like MIT, academic research simply operates as a scale (in time, dollars, and man-power) that is too small to solve many important problems. For these kinds of problems, academia can be the seed, but then industry needs to take over. This is very much Kateeva's story, as it was only with the $200M+ investment we raised over eight years and with our team of now 100+ R&D and Product Development staff that we could develop all the innovations needed to turn our original academic ideas into a product with real-world, global impact.

And that means we need the framework of Intellectual Property to incentivize and reward this kind of industry investment so that $200M bets like this can expect a big ROI when they succeed without the fear that as soon as the product is in the market it will be copied. Otherwise, the driver to commit the resources needed for these kinds of big, technology based innovations will be greatly weakened. In particular, we need strong IP institutions that provide rigorous review before certifying the validity of such IP, we need strong tools for the enforcement of IP, and particularly tools that can be applied internationally, and we need trustworthy and fair forums for the resolution of IP disputes. The United States has historically been a leader in all of these areas, and continues to be a leader today. A critical factor in Kateeva's ability to raise money to continue building its business has been its strong U.S. IP portfolio and the strength of the U.S. IP institutions and laws, particularly including the tools provided under those institutions and laws to enforce even IP violations that occurr outside of U.S. borders. In this way, our investors could gain confidence that even after our equipment weas in the market, and our competitors had reverse engineered our designs, they would still face meaningful legal barriers to enter the market with copy-cat products.

Kateeva's products so far have succeeded on the basis of their superior performance. But now that we have shown the potential of inkjet in this market, we are drawing competitors and it

would be natural for our competitors to try to copy our innovations – after all, it is because of those innovations that our products succeeded where so many others before us failed!

We have naturally taken a global approach to our Intellectual Property strategy, filing for IP rights not only here in the U.S. but abroad, and we are cautiously optimistic that we will be able to protect our innovations abroad. But I am particularly keen to commend my own government for leading the way in establishing a strong, stable, and vibrant IP infrastructure and working continuously to refine and improve it so that it works to support innovative companies building strong domestic businesses like ours.

I look forward to celebrating World IP Day tomorrow, and I thank you for your time today.