



HAPTICS EXPLAINED

A SUMMARY OF THE
HAPTICS CLUB PODCASTS



SENSEGLOVE

INTRODUCTION

Looking for an interesting read about Haptics?

We have selected and summarised our favourite episodes from the podcast series "[The Haptics Club](#)".

The Haptics Club was founded by haptics experts as a place where they can share their knowledge and opinions of haptics in different industries.

The topics of the podcasts range greatly from haptics in enterprise training and the automotive industry to gaming, marketing, movie theatres and lots more. Each speaker provides unique insights into the use of haptics in their particular industry, mentioning the highs, lows, challenges and successes they have experienced so far.

Whether you're a haptics expert looking to learn new facts or a newbie hoping to broaden your knowledge, this ebook has interesting insights for all.

We hope you enjoy the read!

— SenseGlove

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THE SHOCKING HISTORY OF HAPTICS

David Parisi, associate professor of Emerging media College of Charleston

Haptics Legacy

David completed a PHD in media culture and communication, where he began his dedicated work in haptics. In 2018 David published his book; *Archaeologies of Touch*. The book was inspired by the dissertation research he conducted at NYU. David's interest in haptics has led him to research the use of haptics going all the way back to the 1700s.



Top 3 Lessons

- Use cases in haptics can be traced all the way back to the 1700s! The dictionary of philosophy and psychology of 1901 describes haptics as “the doctrine of touch”
- In the 1800s researchers began to push the fact that touch is not just one sense. Questions were raised such as; does pain count as touch? Does tickle count as touch? Does temperature count as touch? Does weight count as touch? Does vibration count as touch?
- In the 1950s, a linguistics system was created that employed 5 different vibrating motors that were positioned on the torso. The creators basically had a 45-character language that they could train subjects to decode. The idea was that this would be a faster way of communicating than Morse code.

Powerful Statement to take away

“The biggest challenge is not to think about haptics in terms of what people are capable of decoding but the associations that they are willing to learn to decode.”

20 YEARS OF HAPTICS TECHNOLOGY

Chris Ullrich, CTO of Immersion

Haptics Legacy

Chris has been involved in haptics for over 20 years. He became captivated with haptics during his master's degree and never stopped working in the field. Chris is now CTO at Immersion. He looks a lot into the future and strategically plans for business health from a technological perspective.

Top 3 Lessons

- We really have poor adjectives in language to accurately describe haptic sensations. For this reason, one of the best ways to understand haptics is by using them.
- Haptics means being able to add a sense of touch, a sense of tactile feedback or a notion of stimulation that you would not otherwise get from a computer interface. This addition is done in a way that is complementary to the audio and video information that is being received. More information, more engagement and more realism can then be obtained from the interaction.
- The haptics ecosystem can be divided into 3 categories: Mobile Space, Gaming & XR Space, and Automotive Space.



Powerful Statement to take away

“With haptics, keeping the product simple and robust is the recipe for getting it to scale. You need to ask yourself 3 questions; Is it simple to make? Is it robust? Does it add meaningful value to the user experience? If the answer to these 3 questions isn't yes, then the product is not going to be sustainable.”

HAPTICS DESIGN FOR AUTOMOTIVE

Filip Aleksandrow, Principal Product Designer at Microsoft

Haptics Legacy

Filip has worked with video games for over 15 years doing UX interactions and animations. Six or seven years ago, Filip wanted to try something different and he noticed the trend of touchscreens in the automotive industry. Filip came across a job opportunity with Immersion and was excited to see them looking into the automotive field with haptics.

Top 3 Lessons

- In terms of the value of haptics in the automotive industry, there are two main considerations: to give the user the information to create a more immersive and safer environment as well as cost reduction for the industry.
- Automotive haptics can be divided into 3 or 4 areas: Expiration haptics, Confirmation haptics, Information haptics, and Skeuomorphic haptics.
- Haptics in the automotive industry does not only exist via touch screens as they can also be expanded into other areas such as steering wheels, seat belts, seats, and pedals.



Powerful Statement to take away

“One of the biggest problems with touchscreens in cars is safety. Touchscreens can be quite a distraction for drivers. This is where haptics can come in and solve some of the issues.”

HAPTICS IN MARKETING & E-COMMERCE

Margot Racat, Marketing UX & haptic researcher in computer-mediated consumption at IDRAC Business School Lyon

Haptics Legacy

Margot is a consumer researcher and she recently started researching how the senses (and in particular the sense of touch) influence people. She started her journey as a business student. Margot became familiar with virtual trials and began her research into haptics and how you can use the sense of touch in a virtual environment in particular for the use of marketing.

Top 3 Lessons

- Despite there now being a good visualisation of products online, the purchasing experiences online and offline are still very different from each other and it is still much harder to get consumers to purchase online.
- Some companies have now started implementing haptics for purchasing. In one instance, the phone vibrates when the customer clicks “add to the cart”. Research has shown that the use of haptics in this case contributed to an increase of over 35% of purchases made.
- If haptics is blended into the experience and is not consciously perceived by the purchaser it is more effective in increasing the marketing outcome.

Powerful Statement to take away

“The sense of touch is the most intimate sense and also the most influential when it comes to a customer's purchase decision.”



WHAT THE FUTURE HOLDS FOR THE HAPTICS MARKET

James Hayward, Principal Analyst and Tech & Science lead at [Cambridge Future Tech](#)



Haptics Legacy

James obtained a degree in chemistry and then started working as an analyst in 2014. He quite quickly started getting involved in projects around haptics. In December 2020, he published a report titled “Haptics 2021 to 2031”. James conducts lots of research into the breadth and technology of the haptics markets as they evolve, in order to provide people with insights into current and future trends.

Top 3 Lessons

- As developments in haptics progress so does the availability of insights and data. There is now plenty of information online where you can inform yourself about haptics, however, the best way to really increase your knowledge is by talking to people who work with haptics.
- As a company, it is very important to understand the value chain and where your partnerships lay in order to make it work. There is no company that can do all of haptics. There are lots of companies that could be collaborators or competitors depending on how you view it.
- There are plenty of opportunities and commercial areas that would benefit from haptics but it has simply not yet been feasible to implement them yet.

Powerful Statement to take away

“The haptics community is very open in terms of sharing a lot of information regarding trends. This opens people's minds to the endless possibilities of haptics, creating new opportunities and driving innovation.”

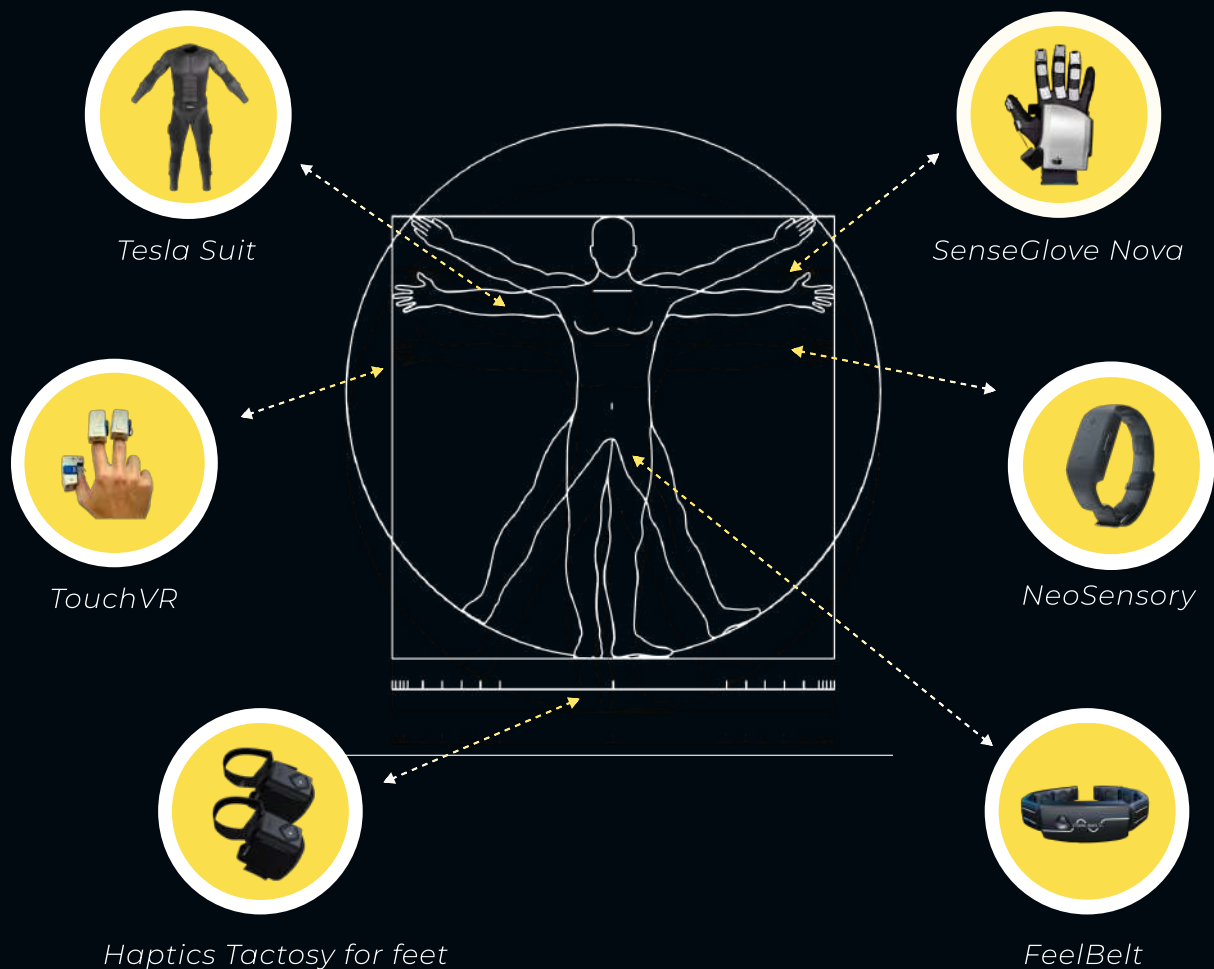
USE OF HAPTICS IN SENSORY SUBSTITUTION

David Eagleman, a neuroscientist at Stanford

Haptics Legacy

David started a company called Neosensory in 2015. The company produces wristbands that use skin vibration to transmit information to the brain. The band has an open API and there are SDKs available for all platforms. Neosensory has made it possible to send 4 billion different combinations of touch directly to the brain.

WEARABLE HAPTICS



Top 3 Lessons

- The skin is our largest organ. It can read signals and bring them to the brain which will make correlations of them. Deaf people wearing a haptic buzz wristband see somebody's mouth move and feel these vibration signals correlated with that to let the brain put those together.
- Our brain has the capability to adjust itself based on the information that it gets from its nerves. If you go blind, your visual cortex will get taken over by other cortexes such as touch, hearing, sense of smell, and taste.
- Non-invasive BCIs (brain-computer interface) come more widely available and can be way more accurate in tracking brain activity and adapting their capabilities. Unlike invasive BCIs, Neuralink and alternatives are way easier to use and do not require open head surgery

Powerful Statement to take away

“The brain doesn’t let any territory lay fallow. We have 86 billion neurons constantly changing, moving shape, and reconfiguring.”

SPATIAL HAPTIC TEXTURES

Dr. Yasemin Vardar, assistant professor at the Cognitive Robotics Department of Delft University of Technology, Netherlands

Haptics Legacy

Yasemin gives frequent lectures at the University of Technology in Delft. During her lectures, Dr. Vardar speaks about haptics, human tactile sounds, haptic rendering, and different tactile devices and how they can be used to interact with robots.

Top 3 Lessons

- Electric vibration is a kind of technology that creates tactile sensations by manipulating the friction forces between our fingertips and a touch screen using electrostatic forces. By changing the input voltage you can create different kinds of frictional forces between your fingertip and the glass, creating different types of tactile sensations.
- Both vision and touch contribute to our texture perception. One of the things that we can perceive solely with vision is the micro and macro geometry of the surfaces.
- When we touch objects in real life we don't only perceive their shape, but we also perceive their material properties (friction, temperature, etc.), therefore we have these tactile cues that we feel when we touch real surfaces. It is a shame to not feel these sensations in the digital world.

Powerful Statement to take away

“Generating tactile textures allows us to get core information about the real world that we usually experience with our fingers”



FEELING TOUCH AND TEMPERATURE WITH CHEMICAL HAPTICS

Jasmine Lu and Jas Brooks, PhD students at the University of Chicago

Haptics Legacy

Jasmine and Jas are both part of the Human-Computer integration lab of the University of Chicago. They are conducting a research project which explores how it is possible to induce haptic sensations such as cooling, warming, tingling, numbing and stinging by applying chemicals to the skin.

Top 3 Lessons

- Chemical haptics is exploring the idea of applying chemicals to the skin to stimulate various receptors in the skin. This includes thermoreceptors, mechanoreceptors, pain receptors, and also blocking receptors in the case of numbing.
- Chemical haptics happens over a space of minutes due to the thickness of skin. The sensations are however long-lasting and last for around 5 to 10 minutes.
- Multisensations can interplay with each other in different ways depending on how quickly you deliver them, and the order that you deliver them. Some compounds counteract the other one, or create a stronger sensation.

Powerful Statement to take away

“Chemically achieved sensations are very different from sensations caused by a heating element or a vibro motor. And we potentially associate these feelings with very affective emotions.”



SURGICAL ROBOTICS & HAPTIC PERCEPTION

Antoine Weill-Duflos, Director of Research and Product Integration at Haply

Haptics Legacy

Antoine was introduced to haptics when studying engineering. He enrolled in a class about VR but the class ended up being all about haptics, with the lectures being given by Vincent Hayward. Vincent's passion for haptics became infectious for Antoine as he continued to do his PhD in haptics. He then began his career in haptics and robotics.

Top 3 Lessons

- Many companies are now able to integrate simulations with real interactions, thanks to the available haptics content related to VR integration. At Haply they wish to create this for the medical metaverse "the medaverse". They are creating a device which provides haptic feedback and also indicates towards how precise people are performing in the metaverse.
- Playing with something in VR and not being able to touch it is very frustrating and unnatural. There has now been a shift in technologies and companies are progressing towards allowing people to touch and interact more naturally with objects.
- There is a lot to play around with in haptics when it comes to haptic illusion. For example, the incorporation of sound and visuals has a great influence on interaction and what you believe you are touching.

Powerful Statement to take away

"Haptic illusion is the same as a visual or auditory illusion but instead of tricking your eyes or your ears, it is tricking the sense of touch. You feel something that isn't true."

QUANTIFICATION OF HAPTICS

Elisa Santella, Managing Director at Grewus

Haptics Legacy

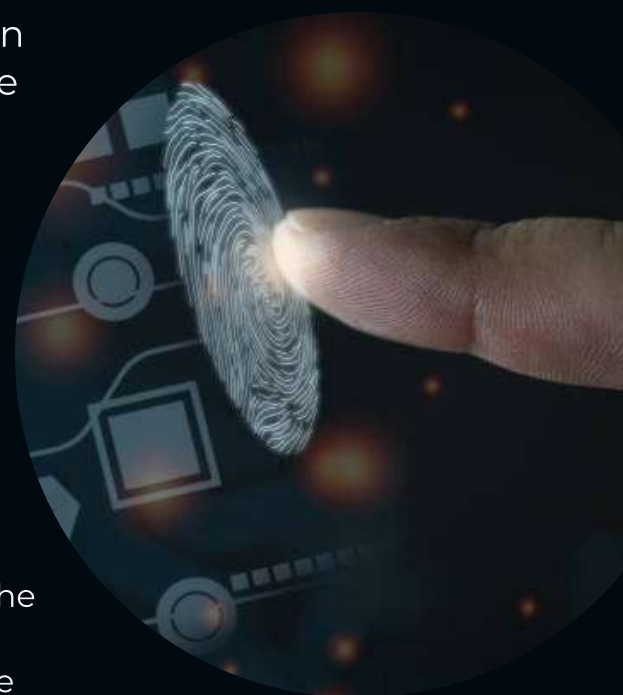
Elisa is one of the founding members of Grewus, a company focused on the implementation of haptics in all applications. Elisa started her career in the automotive industry and then drifted more towards the use of haptics. The company started as an acoustic supplier in the automotive industry. Now they provide customers with active haptic solutions and actuators.

Top 3 Lessons

- Haptic feedback is received by touch. In the automotive industry, feedback is not received solely via the hand, but also via the seat, armrest, and pedals.
- Designing and implementing haptics is a difficult process. Design guidelines help greatly with companies being able to speed up the process of integrating haptics. There is a need to bring a lot of disciplines together in order to make something work. Guidelines would make the first steps in a project much easier and more accessible.
- Some haptic information can be applied in multiple industries depending on the type of feedback, surfaces, application and situation.

Powerful Statement to take away

“Implementing new technology such as haptics in the automotive industry is something that is really challenging. Being able to network and bring people together is very important.”



HAPTICS IN MOVIE THEATRES

Robert Desautels, CTO of D-box

Haptics Legacy

Robert oversees all of the hardware, electronics and motion coding activities at D-box.

The company began specialising in subwoofers. Customers loved the immersion but thought they were too loud. In 2001, D-box launched its first home theatre chair with motion and vibration. By accident, they started in haptics but it has now developed into a big passion.



Top 3 Lessons

- One of the current problems within the market is the lack of clear standards and unified technologies. Some content providers are confused about whether choosing to work with one company/product then limits their possibilities of working with other companies with different technologies. Is X compatible with Y? Creating standards and unifying technologies would contribute to a more solid haptics industry.
- To create the ultimate theatre experience D-box encodes linear content with interactive gaming engine content. Over the years, D-box has really mastered the art of rendering an immersive experience. They are focused on making sure that the experience makes sense to people.
- At D-box, their added value is understanding how your body reacts to vibrations and motions, being able to capture that, take the artistic direction of the content and encode it properly.

Powerful Statement to take away

“Haptics is not just a buzzer or sensation. Haptics is an experience.”

THE HUMANITY OF TOUCH IN A DIGITAL WORLD

Daniel Shor, Research and Development Mechanical Engineer at LoveHoney Group

Haptics Legacy

Daniel started his haptics journey at SenseGlove as a student. After falling in love with haptics, force feedback, and the meaning of touch, he now implements haptics in his product developments in the sexual wellness industry.

Top 3 Lessons

- The most critical pieces that make haptics better than anything else in the sexual wellness industry are rhythms, patterns, the feeling of intimacy, emotion, and connection.
- Haptics can be used in the sexual wellness industry by making use of vibrating columns of air that apply different pressures, creating cutaneous deformation.
- The fact that people nowadays are more open to talking about sex and their emotions, makes it possible to do more collaborative research into sex and the role of haptics.

Powerful Statement to take away

“You will always have a tighter emotional bond through haptics than through vision, speech or audition.”



HAPTICS PROTOTYPING

Thomas Müller, founder of Hapticlabs

Haptics Legacy

Thomas is a designer and creative technologist. He studied industrial design and his interest and research into haptics began during his master's. Thomas founded Hapticlabs and also cooperates closely with the Technical University of Dresden. He got into haptics when he started looking at the ergonomic perspective of products and their ease of use. After beginning his research into haptics, Thomas has been hooked ever since.

Top 3 Lessons

- Developing a haptic interaction is rather similar to developing visual or auditory feedback. It is very much a necessity to develop an intuitive interaction and an interaction that the end user will appreciate. It is very important to analyse the context for each scenario and develop based on the findings.
- When getting into haptics it is important to remember that haptics doesn't solve everything. Despite being able to give certain feedback it is not always the best or only solution. It is important to keep an open mind as to where and how to implement haptics into your project.
- Tactile feedback does not only refer to vibrations on the skin but also to pinching the skin, inducing temperature changes, or movement along the skin.

Powerful Statement to take away

“Every one of us has a different set of libraries in our head and body. The level of perception of feedback can vary greatly depending on the user.”

HAPTICS IN VR GAMING

Alex Meland, Community Manager at bHaptics

Haptics Legacy

Alex's journey with haptics started back in the late 90s when he bought a Star Fox 64 with the rumble pack which was one of the first games to use vibrations to enhance the experience. Since then, Alex has immersed himself into the XR community, working for the leading consumer product for haptic technology in VR and gaming

Top 3 Lessons

- The process of integrating haptics into VR gaming is actually rather simple and with the right games, it greatly enhances the user experience.
- Despite Bhaptics currently focusing more on haptic integration in VR gaming, there is a great opportunity for the use of haptics in PC gaming.
- The progression of haptics ultimately depends on how easily they can be put into the hands of the consumer. A big factor in this is making the product easy to use and desirable whilst companies continue to innovate and push barriers.

Powerful Statement to take away

“Thanks to the VR community and the passion and effort people are willing to invest into it, we can be sure of the progression of haptics and its place in the future.”



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Do you want to find out more about implementing haptics in your company or discuss haptics for your specific needs?

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