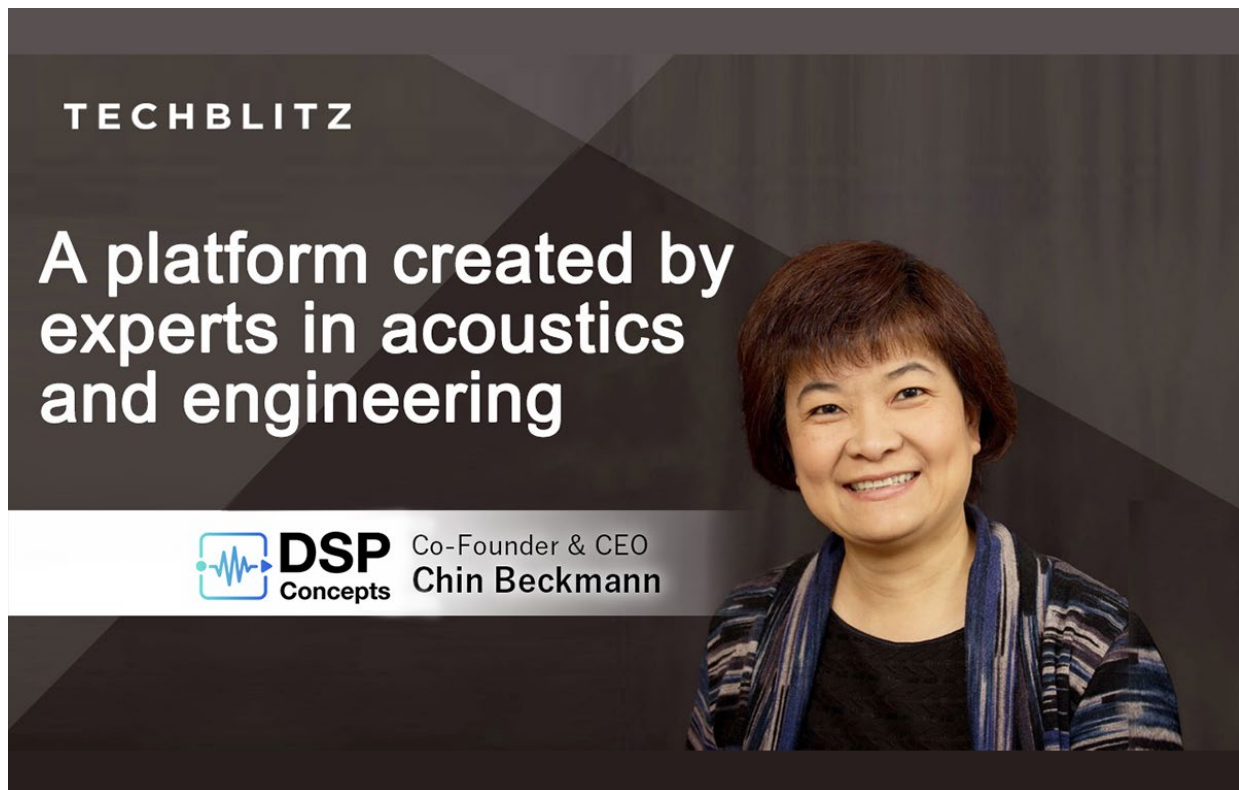


DSP Concepts – Supporting the Design of Audio Components from Cars to Wireless Earphones



Note: This article [originally appeared on Techblitz.com](https://www.techblitz.com). It has been republished in translation.

DSP Concepts is a Silicon Valley-based audio-related software startup. It provides the [Audio Weaver](#) platform, which simplifies the development of audio features in products such as automobiles, home appliances, and smart devices, the [TalkTo](#) noise-eliminating voice recognition solution, and other development solutions for voice communications and audio playback enhancement. We interviewed Chin Beckmann, cofounder, and CEO of the company, to get an overview of their products and business.

Founded by a Married Couple of Acoustics and Engineering Specialists

DSP Concepts was founded by CEO Chin Beckmann and her husband CTO Paul Beckmann. Chin Beckmann majored in computer engineering and piano at Boston University and holds an MBA from Northeastern University. In addition to engineering and business, she is also a musician working as a pianist with the California Pops Orchestra. Paul Beckmann holds a PhD in signal processing from the Massachusetts Institute of Technology (MIT) under Professor Alan V. Oppenheim (Electrical Engineering and Computer Science). Together, the Beckmanns are experts in engineering and acoustics. The abbreviation “DSP” stands for Digital Signal Processor.

One of the company’s flagship products is the Audio Weaver audio experience design platform. This tool makes it possible to use a GUI to flexibly and easily design various audio-related algorithms that then integrated into chips such as microcontroller units and SoCs, and included in products such as cars, TVs, smart speakers, and even earbuds. It is a low-code tool that supports workflows including prototyping, design, and tuning.



Chin Beckmann

DSP Concepts Co-Founder & CEO

Chin majored in computer engineering and piano at Boston University from 1984 to 1988 and has been researching digital audio equalizers ever since.

After graduating, she worked as an OS engineer at Data General and a systems engineer at Proteon before earning an MBA from Northeastern University.

In 2003, she founded DSP Concepts with her husband Paul Beckmann. She has also been a pianist with the California Pops Orchestra for over 20 years.

According to Chin Beckmann, designing audio components is extremely difficult because it involves not only mechanical parts, but also acoustics. For example, even a change in the shape of a product will affect the sound and signal. “When you drop a stone into a lake, waves are created. If the shape of the lake is different, the effect of the propagating waves will be different. Audio is also a wave, so the slightest change in anything can have a large effect; this makes it difficult to design equipment.”

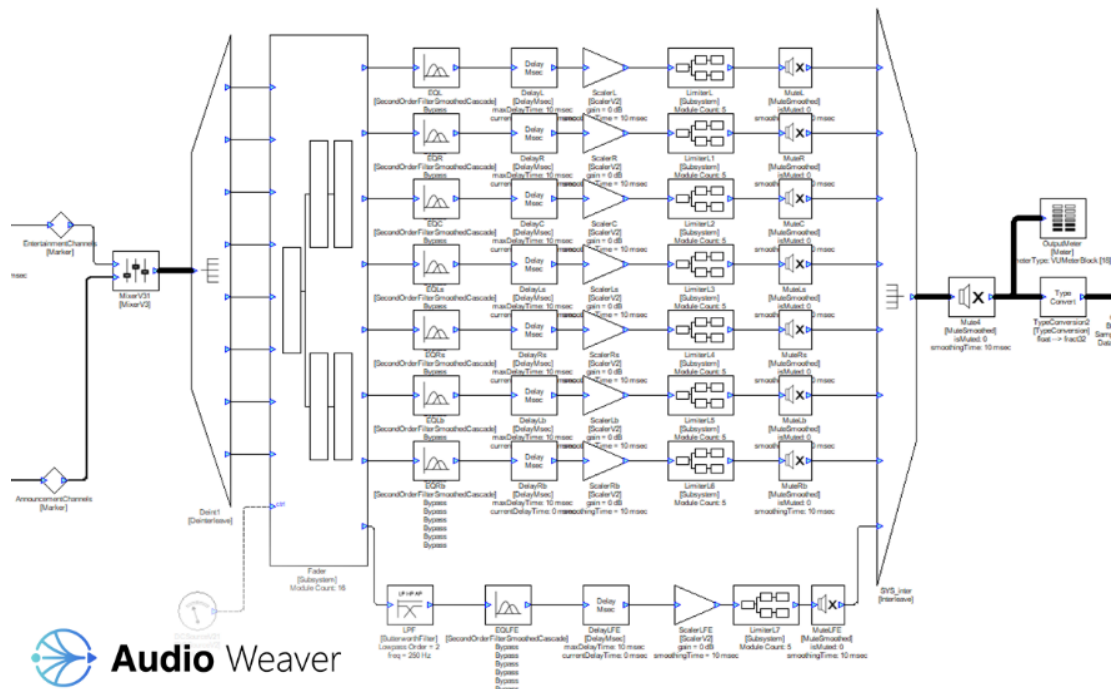
In order to link the parts that make up an audio product, software-assisted engineering is required, and it is necessary to link each function as if they are all using the same “clock.” In addition, tuning with expert ears (“golden ears”) is indispensable. There has to be a framework, like how members of an orchestra perform while reading the same score. Mr. and Mrs. Beckmann are a rare team in that they combine these skills, knowledge, and experience.

“We have been involved in product development in the audio field for many years, so we were asked by the processor maker Arm to help them create a DSP library. After that, Tensilica, a semiconductor manufacturer under the umbrella of Cadence Design Systems, approached us as well. This led us to start a business by soliciting contributions from investors, with the intent of supplying tools that make it possible to design chips without programming.”

Used in Many Luxury Cars, AV Home Appliances, and Smart Devices

Audio Weaver is a development platform that allows audio product developers to build complex audio processing systems without the need for DSP (digital signal processing) programming skills. Featuring an intuitive and easy-to-understand interface, it allows engineers to adjust device configurations and build efficient audio technology while reducing development costs and accelerating time to market.

The platform also has the flexibility to simulate changes that will not affect quality when necessary components cannot be supplied, and alternative chips or parts are used. It is currently used in the design of equipment with built-in audio components, such as cars, TVs, smart devices, hearing aids, VR glasses, appliances, and cameras, and DSP Concepts earns revenue from licensing this tool, as well as royalties per product unit.



The companies and VCs investing in DSP Concepts include Sony Innovation Fund by IGV, Subaru, Porsche Digital, and others. About half of the company’s revenue is automobile-related, such as its business with Porsche and Mercedes; the other half comes from business for various home appliances and smart devices.

Business performance has been strong, with the company growing by more than 100% for four straight years beginning in 2017. In 2021, business performance was flat due to supply chain problems caused by the pandemic, but new customers are increasing. Especially strong is the

field of next-generation automobiles, including electric vehicles (EVs). In Japan, DSP Concepts has started supplying its technology to other automotive manufacturers.

“Cars are the most complex audio product. In a car, you might talk, or you might listen to music, and for this, it’s necessary to cancel the engine and driving noise inside the vehicle. At the same time, EVs are quiet because they don’t use engines, so sometimes enhanced sounds are needed to inform pedestrians of the car’s presence. Brands like Porsche are offering premium sports car sounds. If you ever to go to a showroom, you should check out the engine sounds for EVs.”

Focusing on the Field of Multi-functional Wireless Audio – Becoming an Audio Design Platform Developer

In January 2022, DSP Concepts raised \$28 million (about 3.7 billion yen) in a Series C round, which it will invest in scaling up its business. Although headquartered in Silicon Valley, the company also has offices in Boston, Detroit, Germany, Taiwan, and South Korea. A new market of interest going forward is solutions for TWS (True Wireless Stereo) manufacturers. As computers become more sophisticated, the performance of wireless earphones is improving. DSP Concepts supports those manufacturers in providing products with more diverse functions.

Chin Beckmann explains, “Chips have become more sophisticated, with better memory and power efficiency. That’s why we have decided to enter this field. For example, earphones can be used to personalize listening and enable things like health examinations. They’re difficult because are very small products, but with Audio Weaver they’re easy to design.” Moreover, given that audio will be important in the Metaverse, where advances are expected going forward, DSP Concepts is also paying attention to fields such as VR goggles.

Long ago, when typewriters were used for writing, there was little room for mistakes. But today, you can edit written content seamlessly with word processing software. In addition to writing, standard tools have also emerged in various other fields, such as Photoshop for photo processing or TensorFlow for machine learning. DSP Concepts’ vision is for Audio Weaver to help drive innovation and become the standard design platform in the field of audio-enabled device design.

Asked about entering the Japanese market, Chin Beckmann had this to say:

“Japanese companies are good at mechanical design and have really good processes. Today, the world is becoming software centric. We are part of the software infrastructure. Customers don’t have to think about chips; instead, they can just think about how to make a good product. Audio design in the automotive industry is already moving in this direction. We want to support Japanese companies with this idea for new innovation.”