



Margaux Boyaval

Margaux Boyaval cultivates high-performing user-centric design and innovation teams in MedTech and FemTech. She is an expert in user experience strategy and solution development.

She has led multiple market launches for digital health and medical device products. Her professional experience over 25 years ranges from being a client partner for Fortune 500 companies at Ximedica (now Veranex) to establishing CX & UX capabilities to advance high-profile brands at Amgen and Teva Pharmaceuticals Digital Health.

She has shared her knowledge through speaking engagements and mentoring programs. She has been awarded over 20 patents and was awarded the Reuters Pharma Awards Most Valuable Breakthrough for the Digihaler line of connected inhalers in 2023. She is a wife and mother of two teenage daughters living in the clean air and scenic hills of southern New Hampshire, USA.

Wearable heart monitor considers every user

Margaux Boyaval, Nova Design

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Nova Design uses the principle Design for All to create physical and digital interfaces for healthcare clients. We take an inclusive approach called Universal Design. Universal Design is about creating solutions in a way that the maximum number of people can use the product as is. All things are considered to make the product easy to use for those with or without any kind of physical or cognitive impairment.

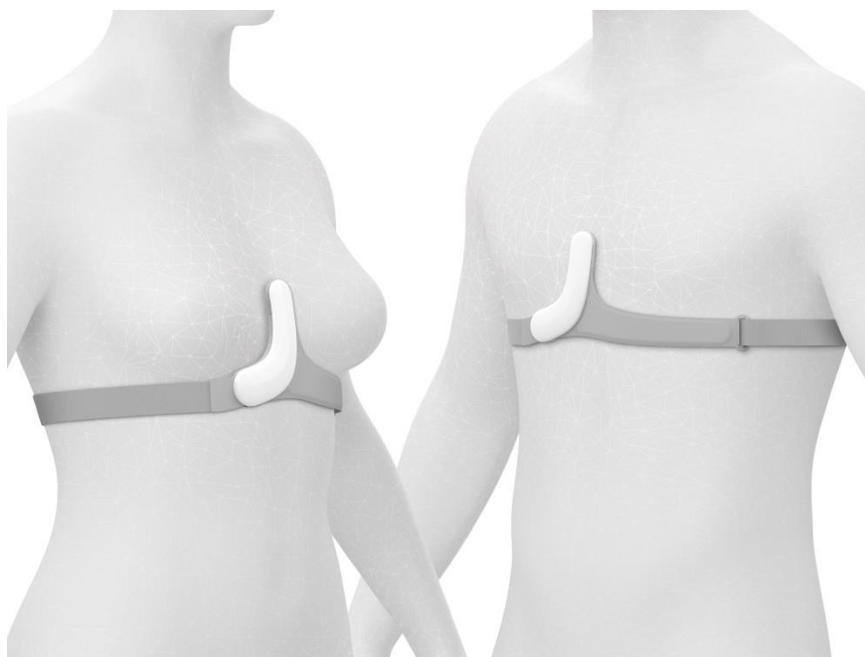
"Universal design is design that's usable by all people, to the greatest extent possible, without the need for adaptation or specialized design."

–Ron Mace (an architect with polio who coined the term in the 1980s)

Often when medical devices are designed the functionality, accuracy, and technology take precedence over what will work best for the user. As a result, the user might have to adapt how they interact or make compromises. These compromises impact the user experience negatively and create frustration and dissatisfaction. Compromises are not necessary when the Universal Design approach is used during the design and engineering phases. When it comes to healthcare products designing with this approach can create better health outcomes.

Nova Design was challenged to design a wearable heart monitor that worked well for both men and women. We knew instantly

that we could do much better than the existing heart monitors. This new heart monitor will be prescribed by doctors and worn by patients over time to assess or diagnose critical heart-related conditions. Knowing that the heart monitor needed to be comfortably worn by both men and women for long periods of time to accurately capture data meant we had to design for all using the Universal Design approach.



Existing heart monitors were not able to capture accurate long-term readings from women. Why? Because they didn't fit a woman's anatomy very well. There is an optimal location for heart monitor sensors on the chest and the existing solutions did not consider women's breast size and location as they relate to the sensor placement. As a result, they could not capture accurate readings. Existing heart monitors use either adhesive to stick directly onto the skin or use elastic straps that fit around the torso or chest to hold the sensors in the correct place. Adhesive monitors do not stay adhered well enough and often fall off or cause skin issues during wear. Heart monitors with elastic straps end up placing the sensors too low on a woman's chest and do not get accurate readings. Using the approach of Universal Design the

Nova Design team set out to design a heart monitor that is easy and comfortable to wear and is gender-inclusive – considering a range of body types and sizes - for both men and women. Designing something that works well for all users eliminates any compromises.

As a first step, we collected data on both men’s and women’s chest dimensions and sizes. Then we created prototypes that were worn and tested by a range of users. After user testing we refined the design. To get better sensor placement we miniaturized the electronics and created a novel “L” shaped design so that sensors can be placed accurately and comfortably on a woman’s chest both below and between the breasts. We eliminated external electrodes to give female users the ability to easily wear undergarments and allow all users to move freely and have peace of mind that their clinician gets the data they need for important heart health decisions. By using the principles of Design for All and the Universal Design approach we created a heart monitor that is accurate, comfortable, and provides accurate, critical data that clinicians need to diagnose and monitor all their patients successfully. At Nova Design, our passion is Design for All – we strive to consider and amplify the needs of those that often get overlooked. When users’ physical, emotional, and cognitive abilities are considered and designed it creates a great experience for every user. We will continue to bring the principles of Design for All to our work and decision-making to ensure that the future is designed to include all.