# The Fontan Blood Pump

## THE NEED

For people born with a single ventricle heart (like Bella Borkowski), options are **scarce**. They must either undergo a palliative series of open heart surgeries, ending with the Fontan, or receive a heart transplant. As the first Fontan patients reach adulthood, emerging data suggests that all Fontans will eventually **fail**. It is no longer a matter of if, but when. There are several complex and individualized factors that determine when and how failure will present, but once it does, the only option becomes a heart transplant and that is not an option for all Fontan patients. While heart transplants are lifesaving, they come with their own risks and another timeline for eventual failure. In 2000, while at Stanford University, Dr. Mark Rodefeld began rethinking the way Fontan patients should be treated. Guided by the belief that there must be a better approach toward stronger outcomes for single ventricle heart patients, he began his research. He sought to develop a treatment option for Fontan patients that would extend the life of the Fontan repair and put off, or **eliminate**, the need for a heart transplant.

## THE PROGRESS

In 2013, after years of research, Dr. Mark Rodefeld reached out to NASA for assistance in developing a conical motor for the Fontan Blood Pump. Unfortunately, the prototype built over the course of 3 years with NASA underperformed, not reaching the necessary speed or accounting for the viscosity of blood. With this information and some residual funds, Dr. Rodefeld assembled a team and got to work on the next prototype, which met the requirements for full functionality. He has received research grants from the National Institute of Health and The Children's Heart Foundation, however, prototyping is extremely costly. It will take another estimated $300,000 to complete the build, and once finished, this prototype will be at near FDA-level sophistication. With the current regulations in place for testing and approval of prototypes – a working Fontan Blood Pump could be ready in 5 years.

In June 2018, the prototype confirmed full feasibility. Now it is a matter of fine tuning and moving forward. The next step is to apply for an NIH grant to fund optimization, clot resistance and studies.

Should we see signs of heart failure in Bella as she gets older this device would save her life.

For more information visit: www.fontanbloodpump.com
Watch Dr. Rodefeld's video on the need for the Fontan Blood Pump at https://vimeo.com/190027599

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