

Earl E. Bakken Medical Device Center Streamlines 3D Prototyping with Ingeo™ PLA at the University of Minnesota



SITUATION

The Earl E. Bakken Medical Device Center at the University of Minnesota combines basic and translational research, education and training, and public outreach to support the future of medical devices. They are built on a mission that believes every student and medical professional in the medical device field should receive hands-on training and experience with medical device prototyping and design. Their trainees, including Interns and Fellows, are charged with defining an unmet clinical need and working together with clinical and industry partners to develop a device to address that need.

Since 2008, their Innovation Fellows Program has sought to develop the next generation of leaders in MedTech and has generated:

250+

INVENTION DISCLOSURES

34

LICENSED PRODUCTS

100+

PATENT APPLICATIONS

16

START-UP COMPANIES

16+

ISSUED PATENTS

\$24

MILLION IN FUNDING RAISED

Medical device prototyping is required for users to give feedback on the design and function of the proposed device. This step is critical to the development of new and innovative solutions for unmet clinical needs. The traditional process of developing a medical device prototype (even a non-functional prototype) can take days or weeks for a single iteration to be molded or machined. When developing an innovative device, the design process quickly becomes complicated, requiring several iterations and multiple design changes throughout the device prototyping process. Since the Earl E. Bakken Medical Device Center is traditionally government funded, they were struggling to maintain an innovative business model with these traditional practices in place. With high up-front costs for traditional device design prototyping, and the desire to expand their fellows program, they were at risk of driving their mission in a prototyping model that would not be sustainable long term.

In order to drive the innovation to address unmet clinical needs and continue to develop the mission the Fellows Program and center were built on, they needed to find a low-cost, responsive method for medical device design prototyping and anatomical modeling.

SOLUTION

The adoption of fused filament (FFF) 3D Printing was a game changer for the Bakken Medical Device Center. This method of 3D printing allows most non-functional prototypes to print in hours as opposed to days for other printing methods and weeks for other prototyping methods. It allows iterations to be made quickly and revisions to be rapidly produced as the concept and design develops. By bringing the prototyping process in-house and using Ingeo PLA filament for the device printing, the team was able to save time and money since Ingeo is more affordable, easier to use, and faster to print than other 3D printing materials. Additionally, **PLA is less prone to warping and can be printed at lower temperatures —two key performance characteristics that allow for the fine detailing needed in medical device prototypes and anatomical models.**

OUTCOME

The Bakken Medical Device Center has selected NatureWorks as a key strategic resource provider, and, to date, NatureWorks has supplied over 175kg of Ingeo PLA filament to the center at the University of Minnesota in order to support them in their mission.

Hundreds of prototypes and models have been created with Ingeo PLA including models to support the separation of conjoined twins by printing Ingeo models of the organ systems the twins shared. This included the liver, heart, and chest, which were printed and used to plan the surgeries needed to separate without risking the patients' lives.

NatureWorks is proud to collaborate with the University of Minnesota and the Earl E. Bakken Medical Device Center on this work. Our team continues to supply material used by staff, medical professionals, and Fellows at the center, as well as community and industry partners utilizing the technologies available at the Bakken MDC, helping to drive their mission of a better future for healthcare.



“The donated Ingeo filament helps us give students and researchers real world experience in designing and prototyping medical devices to meet unmet needs in the medical device market. This experience is invaluable to students and gives them an advantage over their peers...This can all be done using FDM printing at the MDC thanks to NatureWorks.”

*Steve Thomalla,
Laboratory Supervisor at the Bakken MDC*

STRATEGIC OBJECTIVES

- Researchers at the Bakken MDC need a low-cost, fast source material that is suitable for non-functional medical device prototyping
- Reduce the time for prototype iterations to allow for medical device prototypes to be produced rapidly
- Uncover a method that allows for responsive and rapid iterations of anatomical models to support the unique unmet clinical needs these researchers are studying
- Find a Strategic Resource Provider to help them maintain and sustain their mission of developing innovative devices to industry for clinical applications

OUTCOMES

- Researchers, Fellows, Industry and Community Partners have printed over 250 prototypes/models with Ingeo via FFM 3D Printing at the facility.
- NatureWorks has donated 177 x 1kg spools of Ingeo 3D filament to the Bakken MDC to support printing projects.
- Medical device innovation has become more rapid, sustainable, and cost-effective to the trainees, researchers, and medical professionals at the Bakken MDC.

KEY STAKEHOLDERS

- Earl E Bakken Medical Device Center
- Bakken MDC Innovation Fellows Program
- University of Minnesota
- NatureWorks

RESOURCES

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natureworksllc.com | inquiry@natureworksllc.com | [@natureworks](https://twitter.com/natureworks)

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