



# 3D vector field-guided toolpathing for 3D bioprinting

**A novel software suite for converting three-dimensional vector field data into machine code for manufacturing.**

**IP Status:** Copyrighted; [US Patent Pending](#), Application No. 18/769,027

## Applications

- Disease modeling
- Drug development
- Patient treatment

## Technology Overview

Researchers at the University of Minnesota have developed a novel software suite that intakes either fiber tractography data or Diffusion Tensor Magnetic Resonance Imaging (DT-MRI) and produces G-code, the type of machine code used by most 3D printers. The Nonplanar, Architecture-Aligned Toolpathing for In Vitro 3D bioprinting (NAATIV3) framework processes DT-MRI data to map tissue fibers, reduce them to a representative subset, remove conflicting fibers, select a printing sequence, and output a G-code file.

## Phase of Development

### TRL: 4-5

The software suite is fully scripted, documented, and tested on a limited set of ex vivo human cardiac data.

## Researchers

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