

COMBAT-VT:

Isogeometric Analysis of an Electromechanical Bi-Ventricular Heart Model

R. Willems¹, C.V. Verhoose², O. van der Sluis^{2,3}

¹Department of Biomedical Engineering, University of Technology Eindhoven

²Department of Mechanical Engineering, University of Technology Eindhoven, ³Philips Research Eindhoven

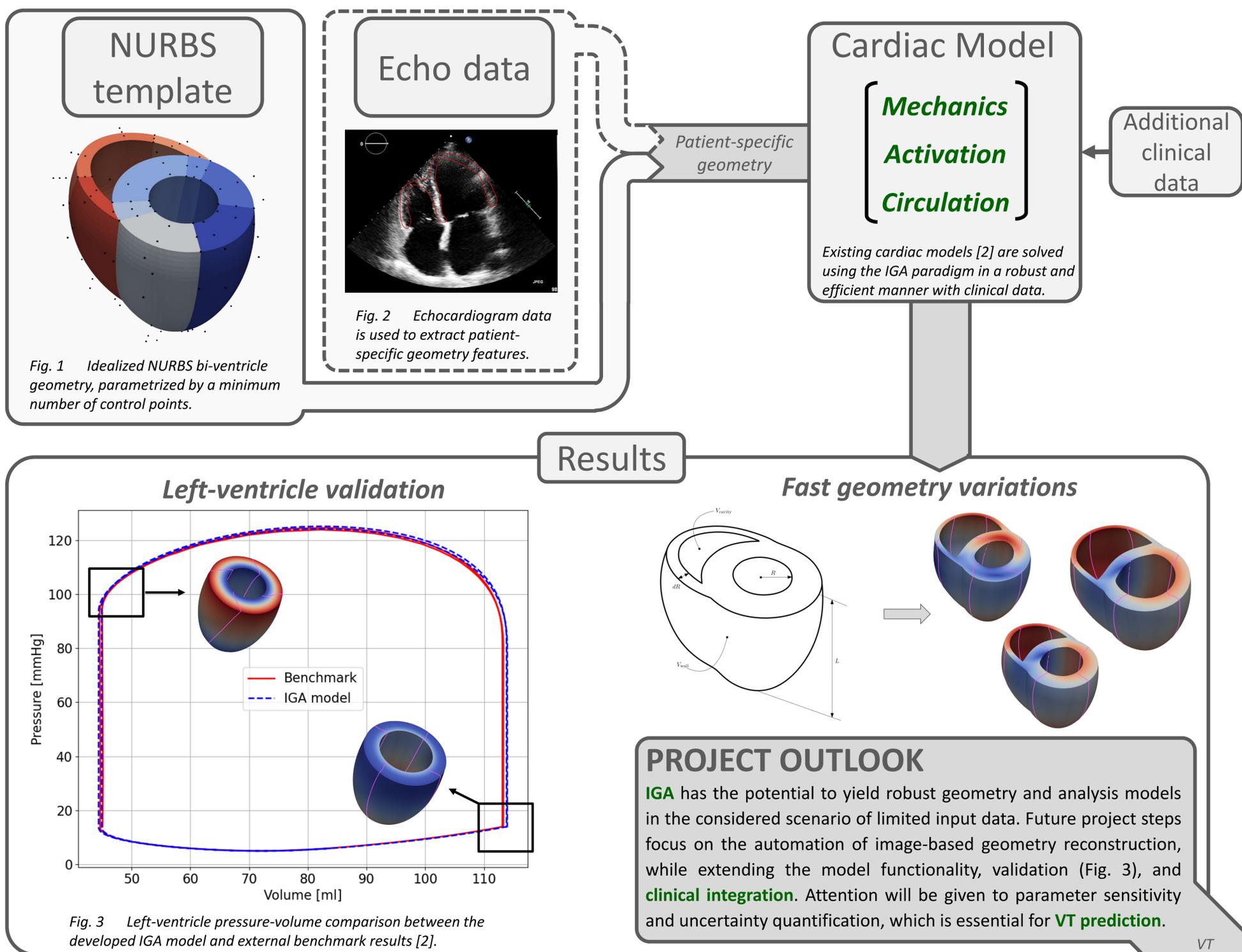
Keywords: Isogeometric Analysis | Finite Element Method | Cardiac Mechanics | Patient-specific | Ventricular Tachycardia

MOTIVATION AND OBJECTIVE

Computer simulations provide information that can be used by clinicians to support decision-making (Computational-model-based decision support = COMBAT) regarding the treatment of **Ventricular Tachycardias** (VTs). It is the goal of this **COMBAT-VT** subproject to develop efficient and robust models that can be integrated into the clinical workflow.

SIMULATION WORKFLOW

Our simulation framework combines the **Isogeometric Analysis** (IGA) simulation paradigm [1] with image recognition techniques to obtain **patient-specific** computer models (Fig. 1 & 2). Simulations will be performed directly on a Non-Uniform Rational B-Spline (NURBS) bi-ventricular geometry. Computational costs are improved because of the limited number of control points that quantify the geometry.



REFERENCES

- [1] Hughes, T. J. R. et al. (2005). *Isogeometric analysis: CAD, finite elements, NURBS, exact geometry and mesh refinement*, Comput. Methods in Appl. Mech. Eng., 194.39, 4135 - 4195.
- [2] Bovendeerd, P. H. M. et al. (2009). *Determinants of left ventricular shear strain*. Am J Physiol Heart Circ Physiol. 297(3):H1058-68.

