

The VPH-Physiome Project:

CellML, FieldML, PMR2

Funding VPH-Physiome infrastructure

Physiome Sciences 1995 - 2002



IUPS Physiome Project 1996 -



Wellcome Trust 2004 - 2009

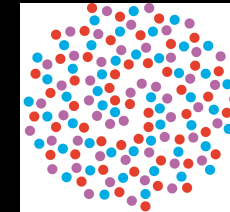


FRST NERF

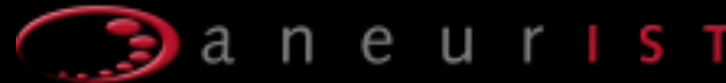
NZIMA 2002 - 2010



MWC 2002 -



VPH @neurIST 2006 - 2010



VPH NoE, VPH euHeart 2008 - 2013

eBonz 2009 -

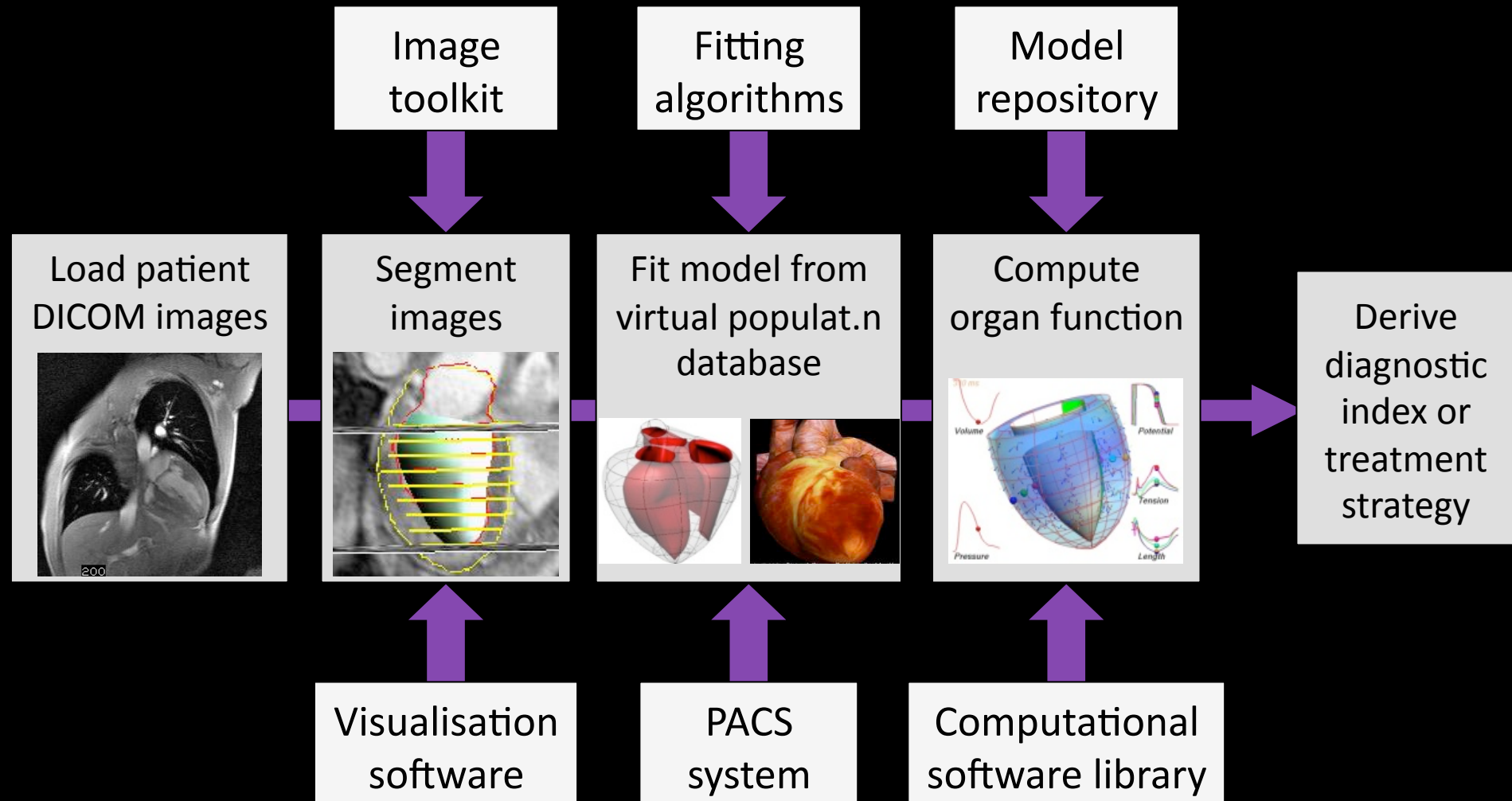


VPH Ricordo 2010 - 2012

VPH MSV 2010 - 2012

IMI PKPD application 2011 - 2015?

Example of clinical workflow

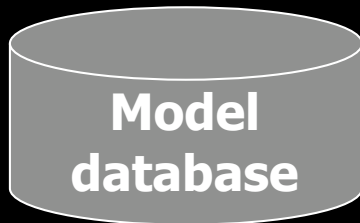


Key requirements

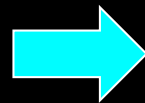
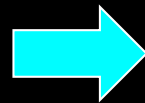
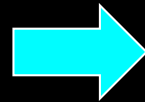
- 1. Minimum information standards**
(MIRIAM, MIASE)
- 2. Markup languages for models and data**
(CellML, SBML, FieldML, DICOM, BioSignalML, ...)
- 3. ML standard for the simulation experiment**
(SED-ML)
- 4. Models and data repositories**
(CellML, BioModels)
- 5. Meta data standards & tools for annotating the models**
(RDF, SAINT)
- 6. Tools for authoring models, running simulations,
visualising models & data** (OpenCell, cmgui, OpenCMISS, ...)
- 7. Mechanisms for handling the ref description of a model**
- 8. Support for workflows based on web services**

The reference description of a model

CellML, SBML,
FieldML



DICOM,
BioSignalML



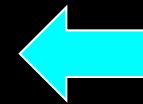
Model
simulation

A large blue square box containing the text 'Model simulation'.

Publication
results &
validation

A large green square box containing the text 'Publication results & validation', with 'Publication' underlined.

SED-ML



The main infrastructure projects

Standards, website, model repository, tools, documentation, ..
Open source, freely available, community projects

CellML

OpenCell

www.cellml.org

FieldML

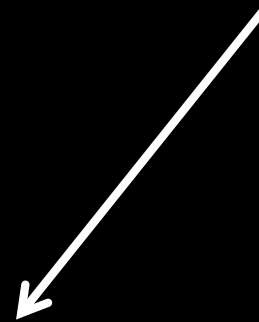
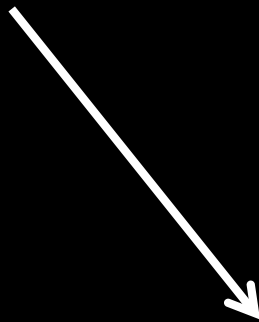
Cmgui/Zinc

www.fieldml.org

ModelML (?)

OpenCMISS

www.OpenCMISS.org

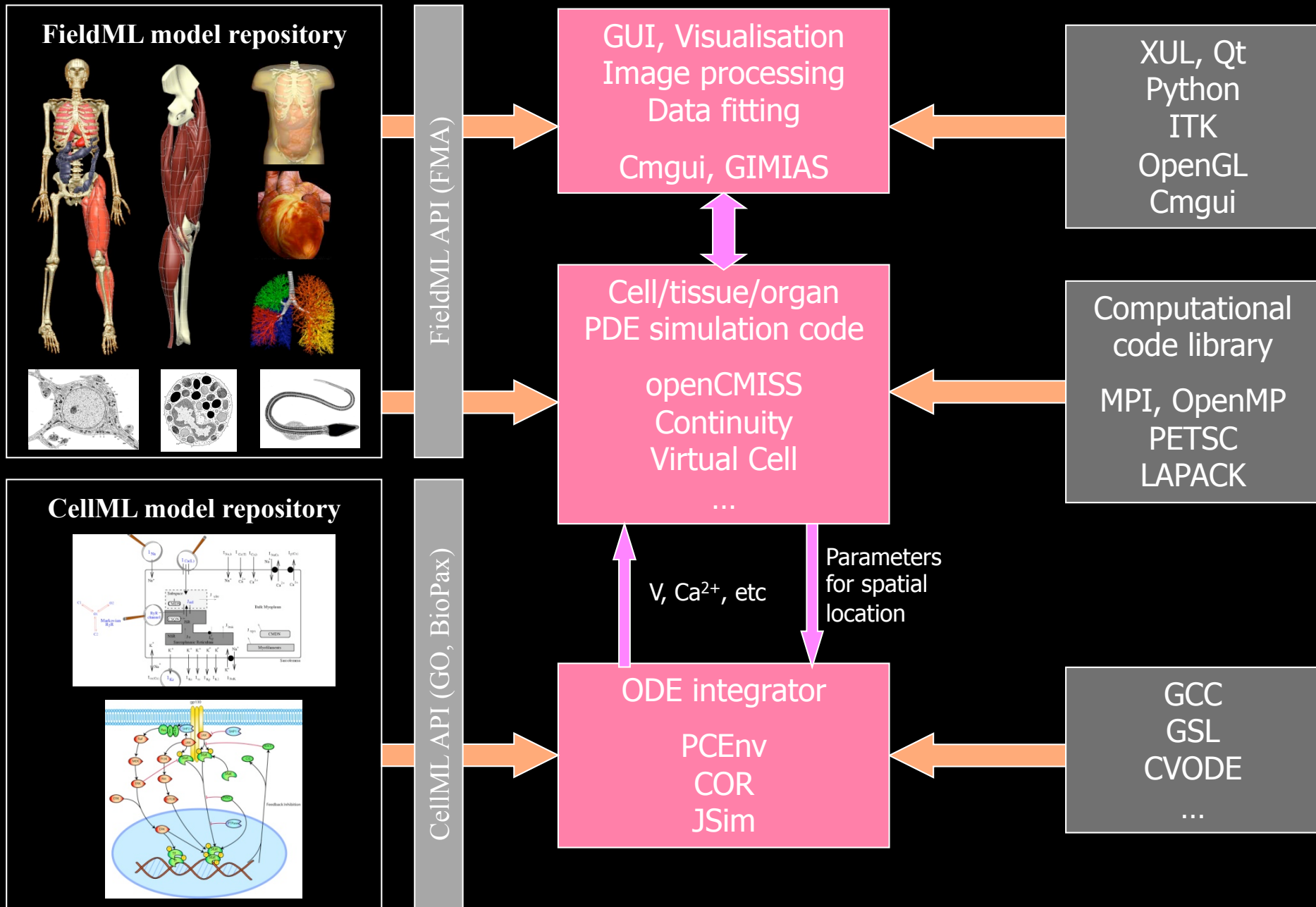


PMR2: CellML & FieldML models

Software infrastructure

Web accessible databases

Open source libraries

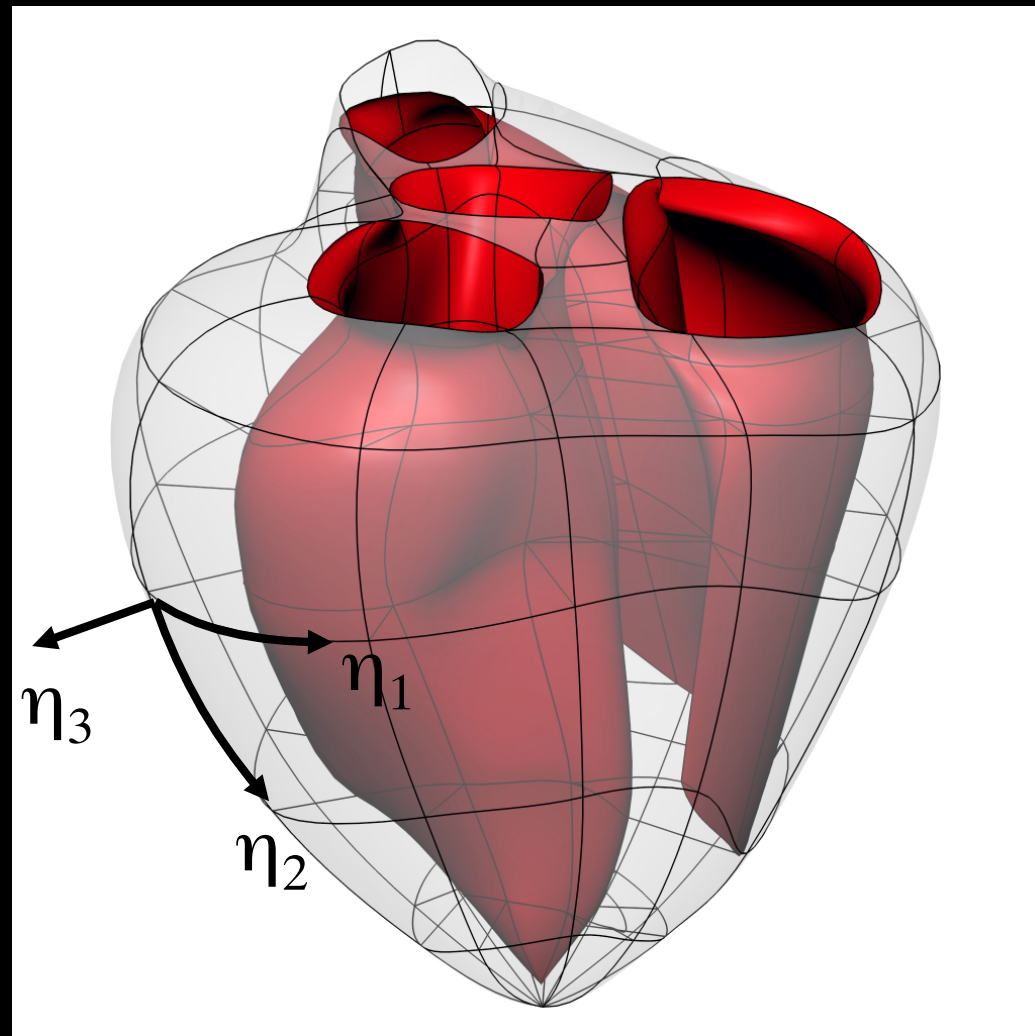


RICORDO: A communal annotation strategy that supports the interoperability of VPH data and models across different biological scales

**WP6: VPH toolkit organ-level pilot study:
Volumetric data and models**

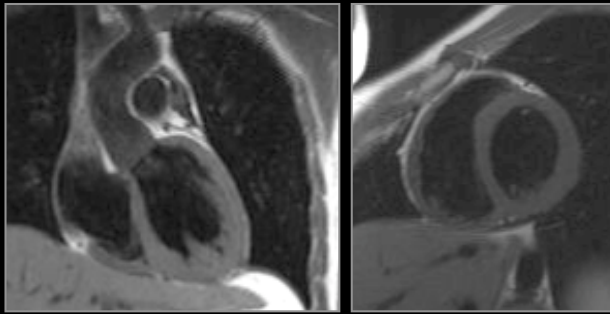
**Interoperability requirements
for computational heart modelling**

Material coordinates locate any material point



Model provides framework for aligning data

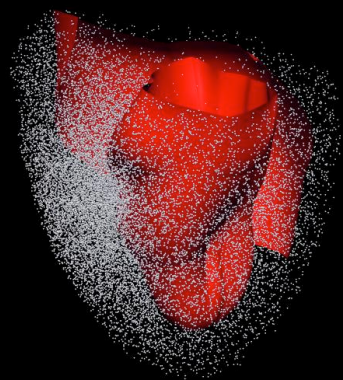
Radiological data



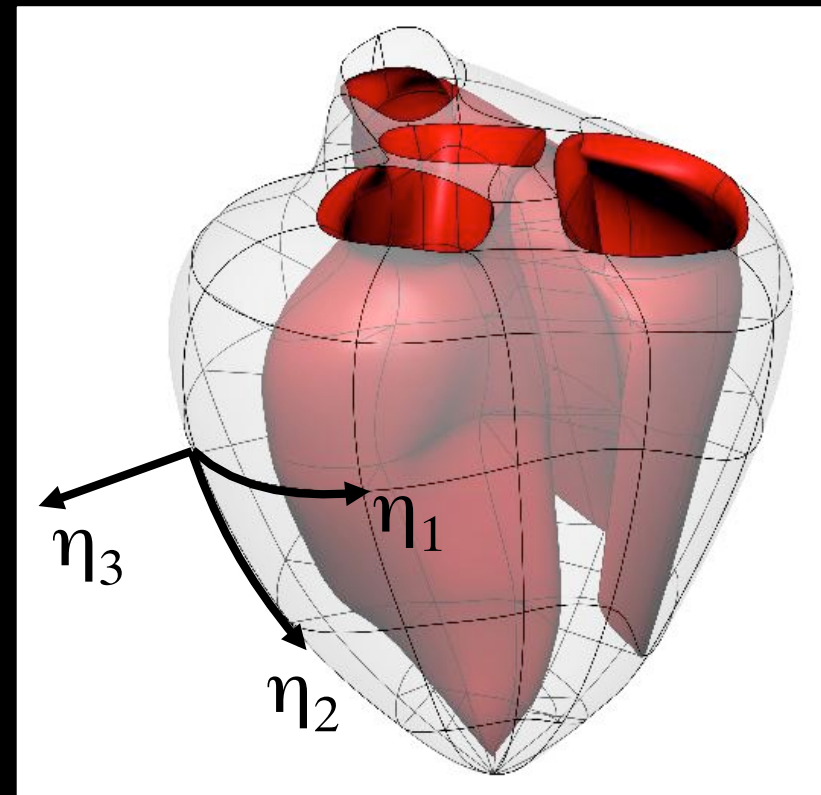
Structural data



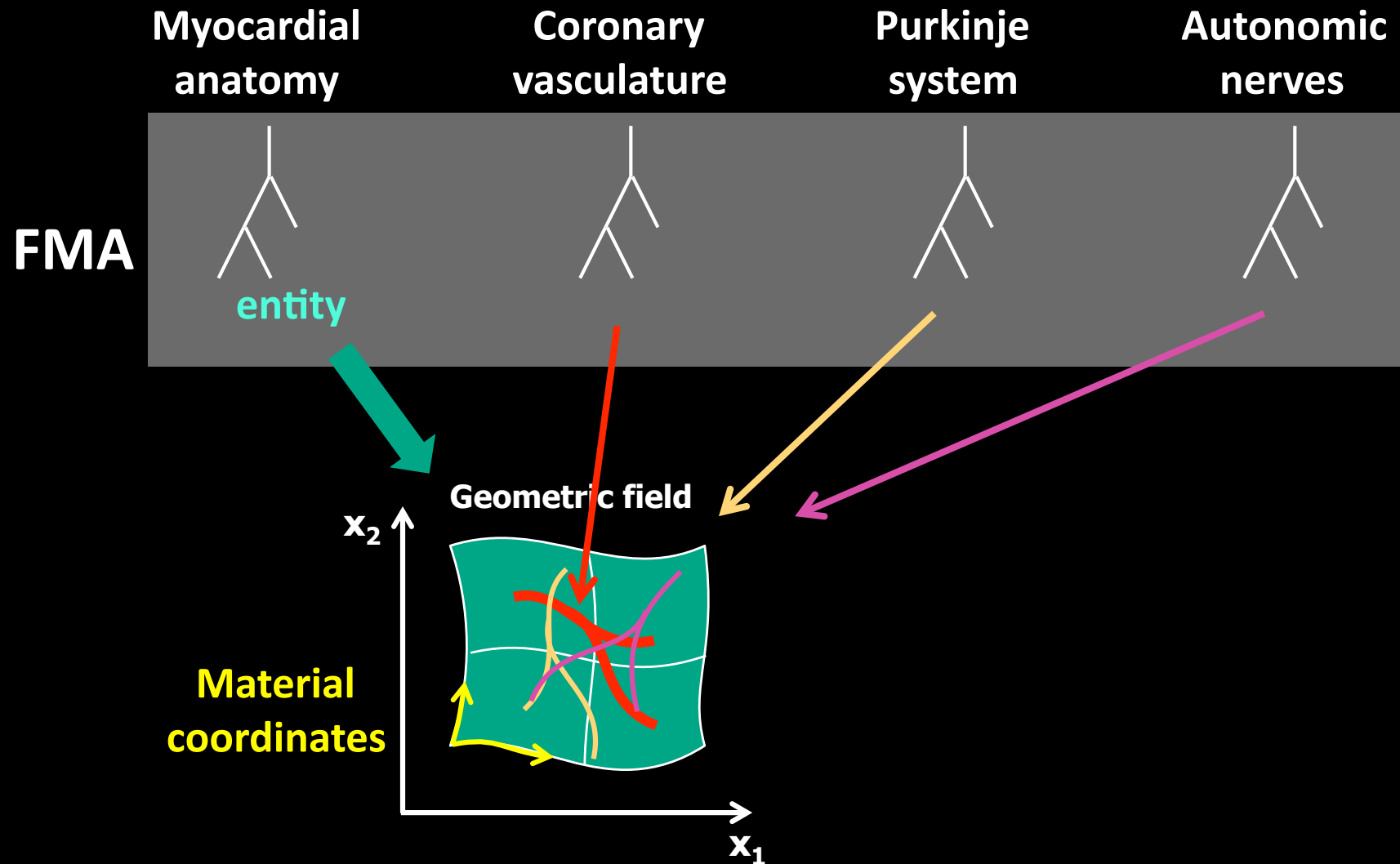
Molecular data



Mathematical model



Mapping FMA to spatial models



Some future requirements

Component annotation – metadata, OBO Foundry, SAINT
(very important for returning models from web queries)

Reference descriptions using CellML, SBML, SED-ML
(for demonstrated model reproducibility)

More domain-expert curators
(Catherine needs a team!)

Parameters with stochastic or population variation
(for PKPD and parameter estimation)

Webservices to facilitate use of models in larger workflows

Thanks to Catherine!



