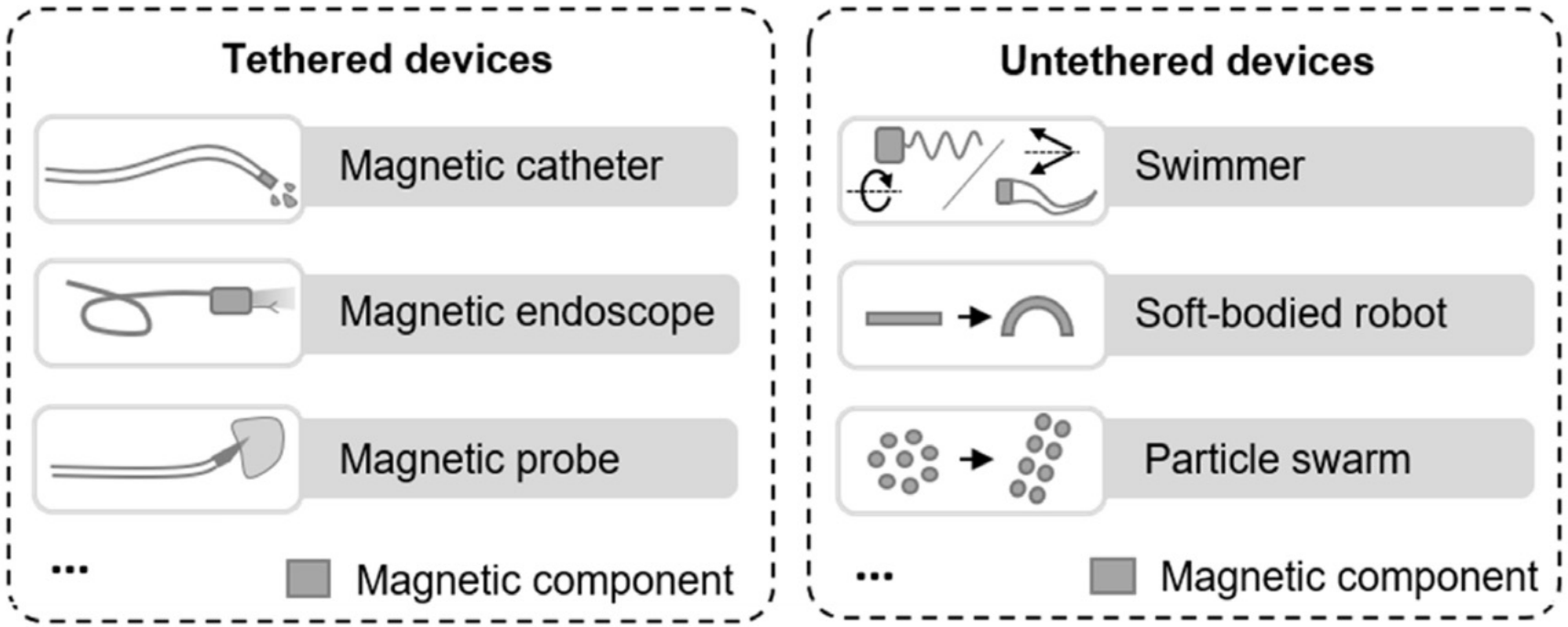
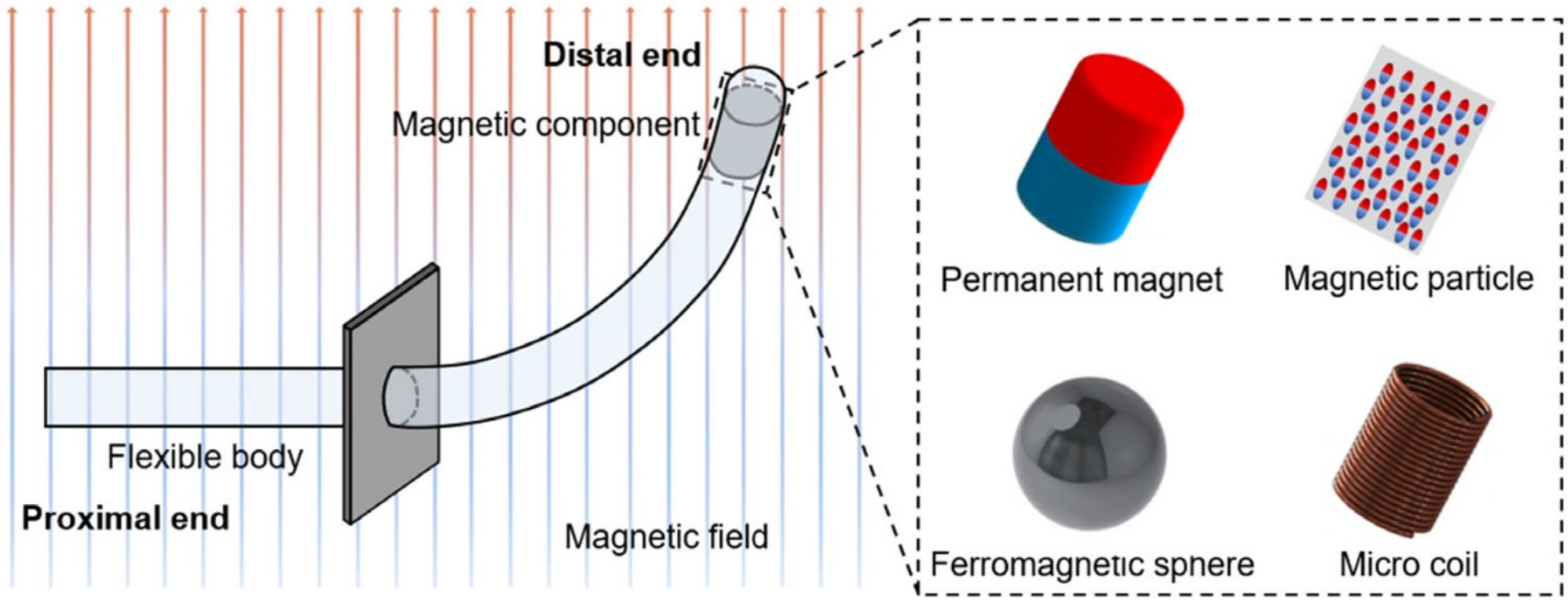
Simulator analysis

Magnetically actuated



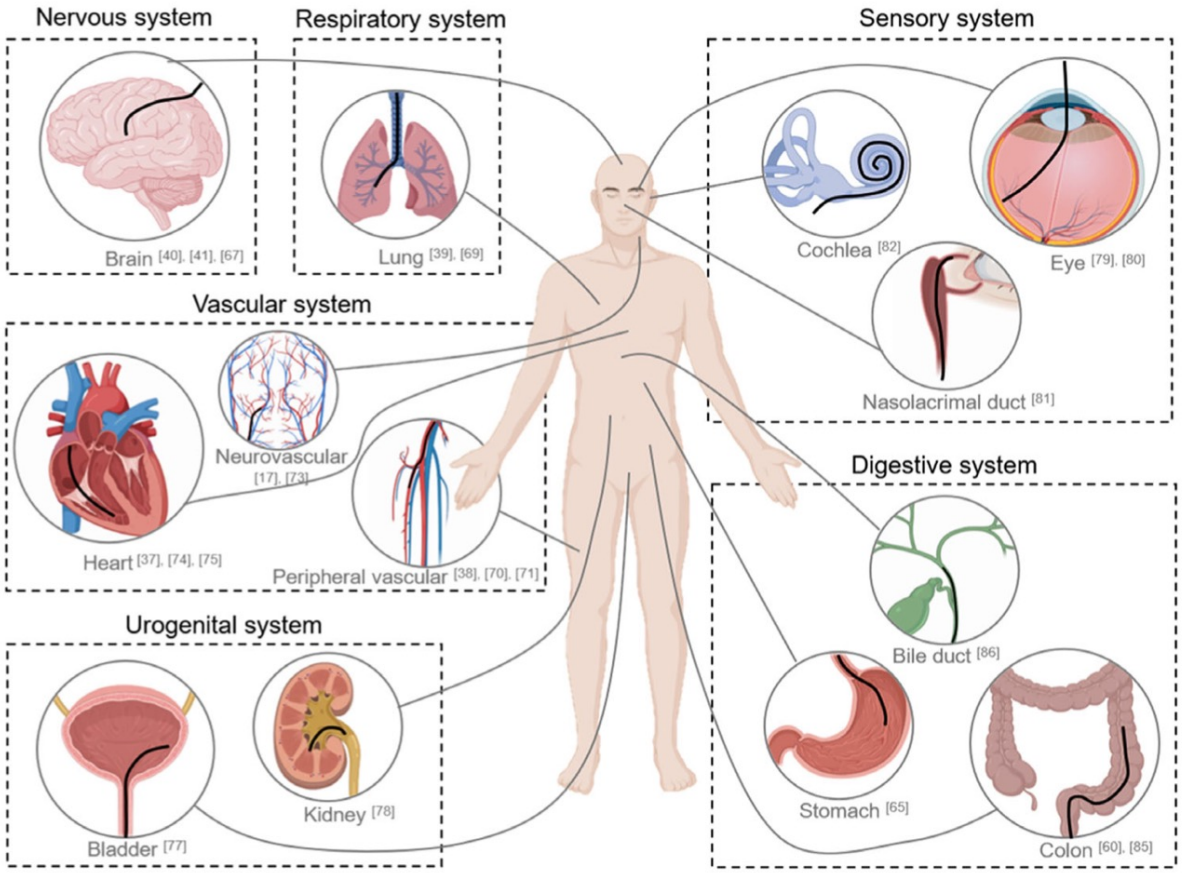
Yang, Z., Yang, H., Cao, Y., Cui, Y., & Zhang, L. (2023). Magnetically Actuated Continuum Medical Robots: A Review. *Advanced Intelligent Systems*, 2200416.

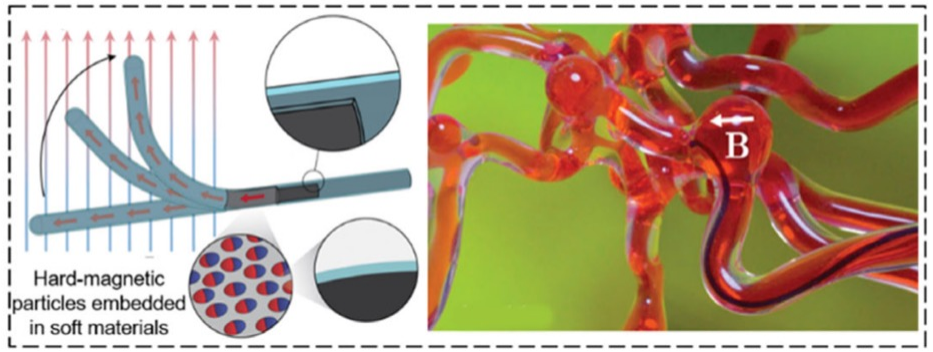
Concept of magnetically actuated continuum robot



Yang, Z., Yang, H., Cao, Y., Cui, Y., & Zhang, L. (2023). Magnetically Actuated Continuum Medical Robots: A Review. *Advanced Intelligent Systems*, 2200416.

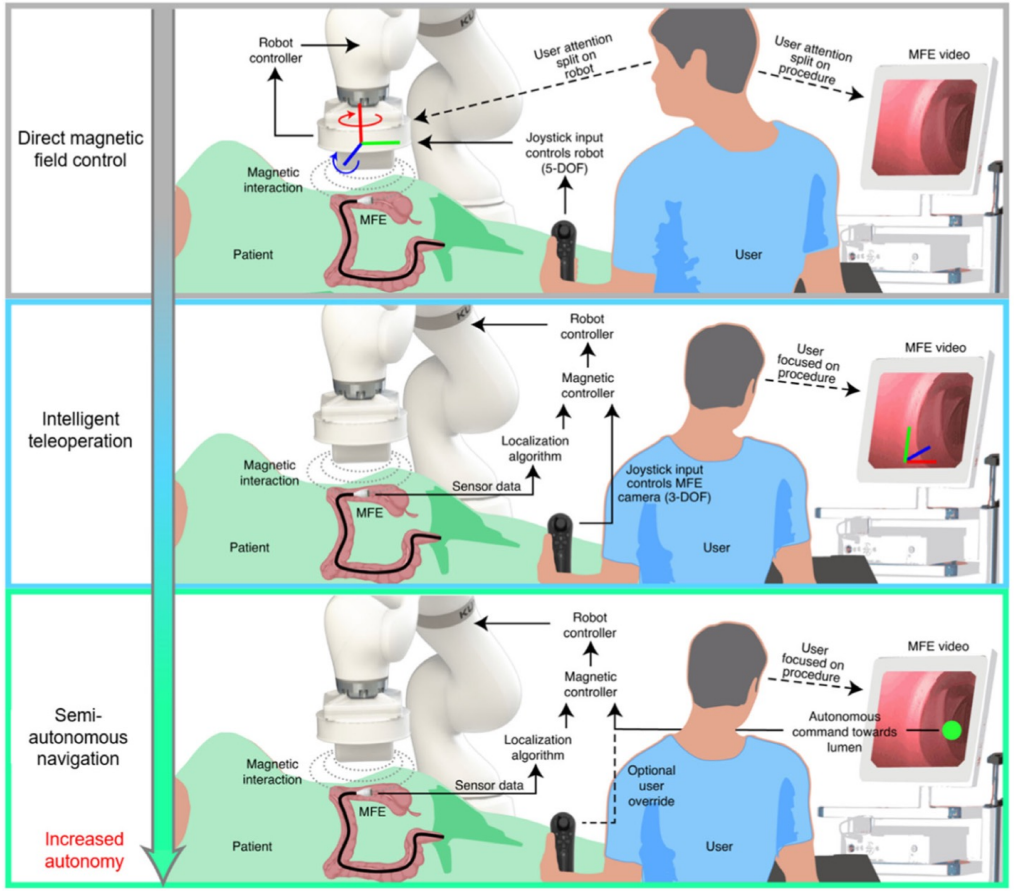
Potential application





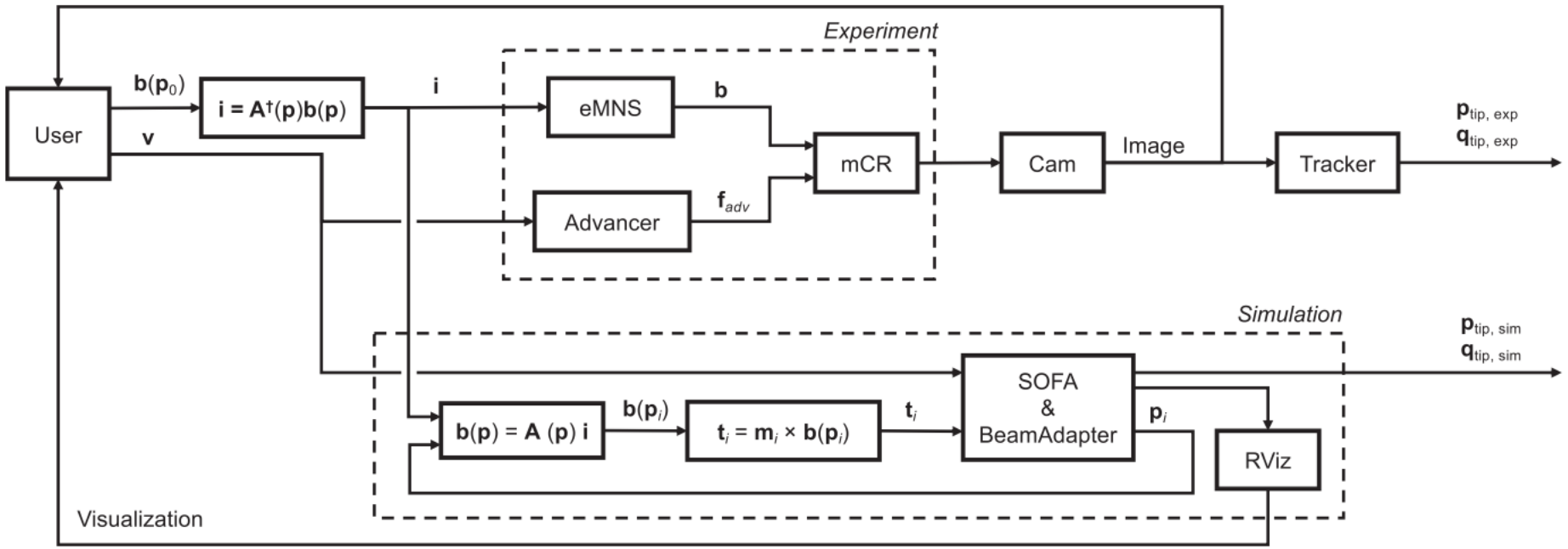
Yang, Z., Yang, H., Cao, Y., Cui, Y., & Zhang, L. (2023). Magnetically Actuated Continuum Medical Robots: A Review. *Advanced Intelligent Systems*, 2200416.

Control overview



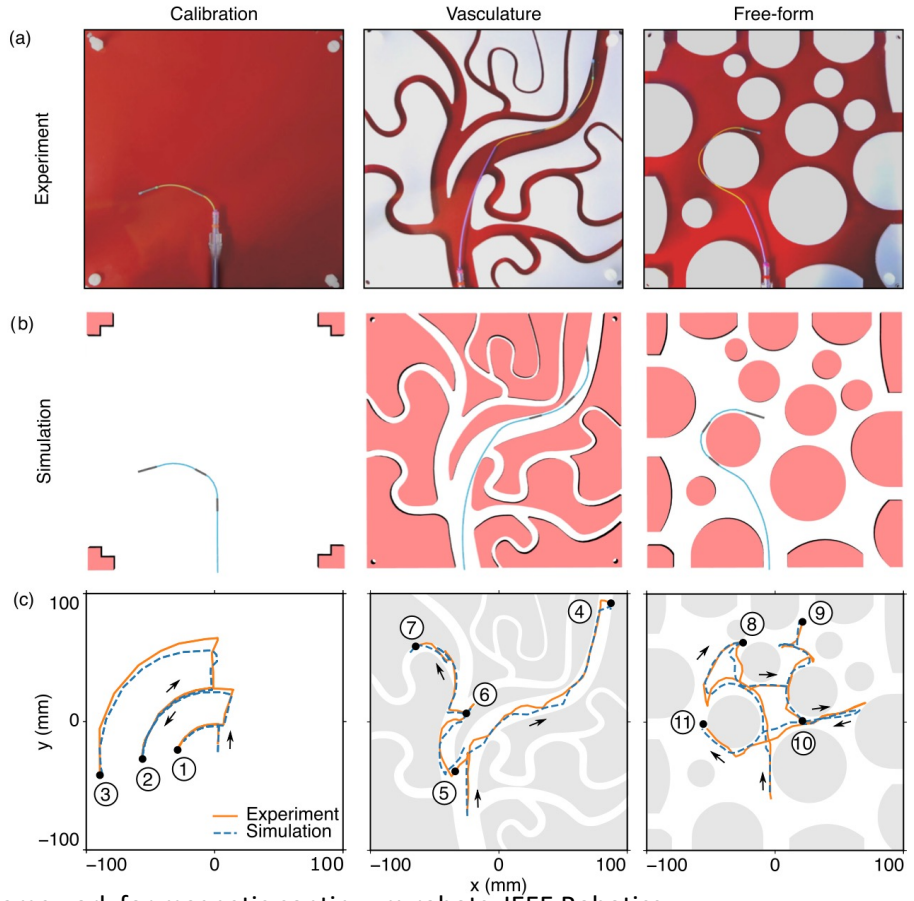
Yang, Z., Yang, H., Cao, Y., Cui, Y., & Zhang, L. (2023). Magnetically Actuated Continuum Medical Robots: A Review. *Advanced Intelligent Systems*, 2200416.

A Simulation Framework for Magnetic Continuum Robots



Dreyfus, R., Boehler, Q., & Nelson, B. J. (2022). A simulation framework for magnetic continuum robots. IEEE Robotics and Automation Letters, 7(3), 8370-8376.

Experimental validation of the m-CR simulator in planar environments.

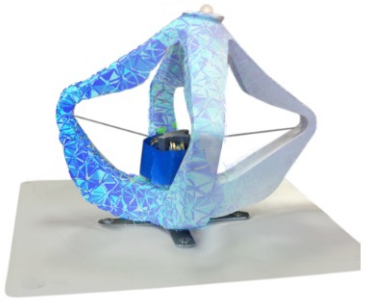


Dreyfus, R., Boehler, Q., & Nelson, B. J. (2022). A simulation framework for magnetic continuum robots. IEEE Robotics and Automation Letters, 7(3), 8370-8376.

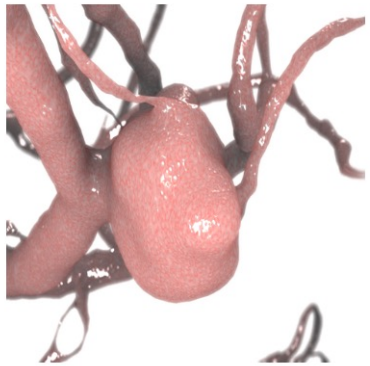
SOFA

Today, SOFA gathers about 15 years of research in physics simulation. Many publications were accepted, several simulators were developed and five startups were created. The research topics were diverse:

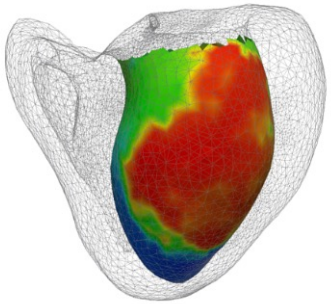
- Solid mechanics with the simulation of the brain, the ear, the bones, the heart, the liver,
- Fluid dynamics with the simulation of fat filling and blood flow in aneurysms,
- Thermodynamics with thermo-ablation of tumors,
- and many other topics as image processing, animation or biological applications !



Soft robot control



Endovascular simulation



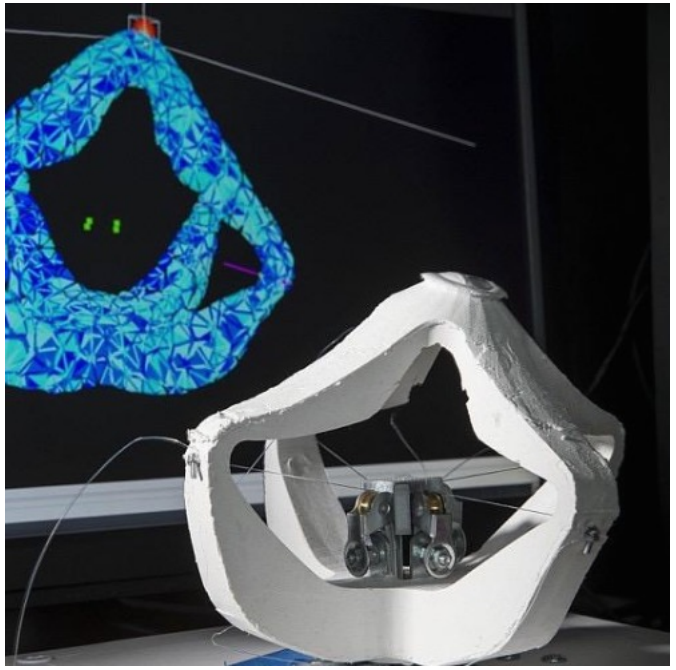
Cardiac electrophysiology

Protein structure prediction

https://www.sofa-framework.org/about/story/

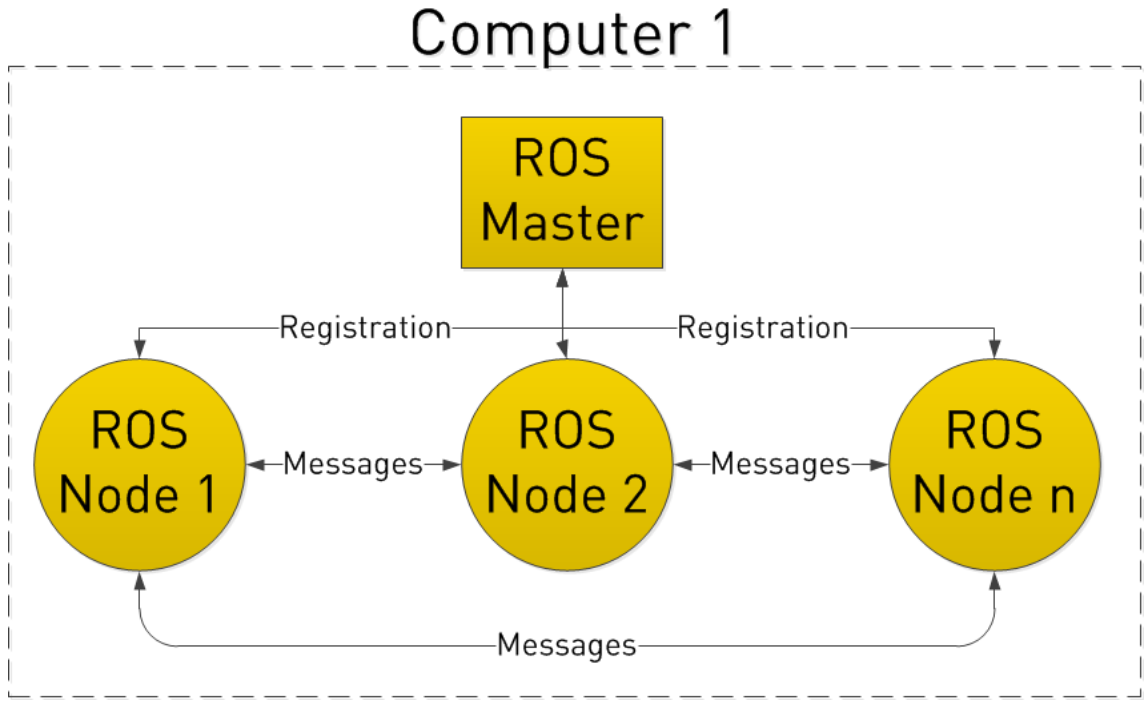
Components

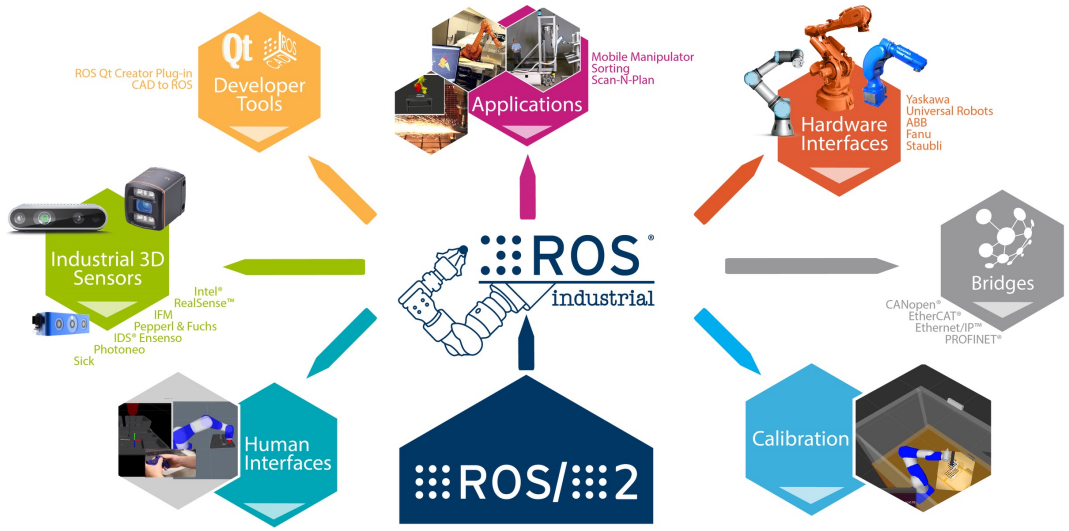
BeamAdapter



Softrobot plugin

ROS


Computer 1
ROS Master
Registration
Registration
ROS Node 1
Messages
ROS Node 2
Messages
ROS Node n
Messages


ROS Qt Creator Plug-in
CAD to ROS
Developer Tools
Applications
Mobile Manipulator
Sorting
Scan-N-Plan
Hardware Interfaces
Yaskawa
Universal Robots
ABB
Fanu
Staubli
Industrial 3D Sensors
Intel® RealSense™
IFM
Pepperl & Fuchs
IDS® Ensenso
Photoneo
Sick
ROS industrial
Bridges
CANopen®
EtherCAT®
Ethernet/IP™
PROFINET®
Human Interfaces
ROS/ROS 2
Calibration

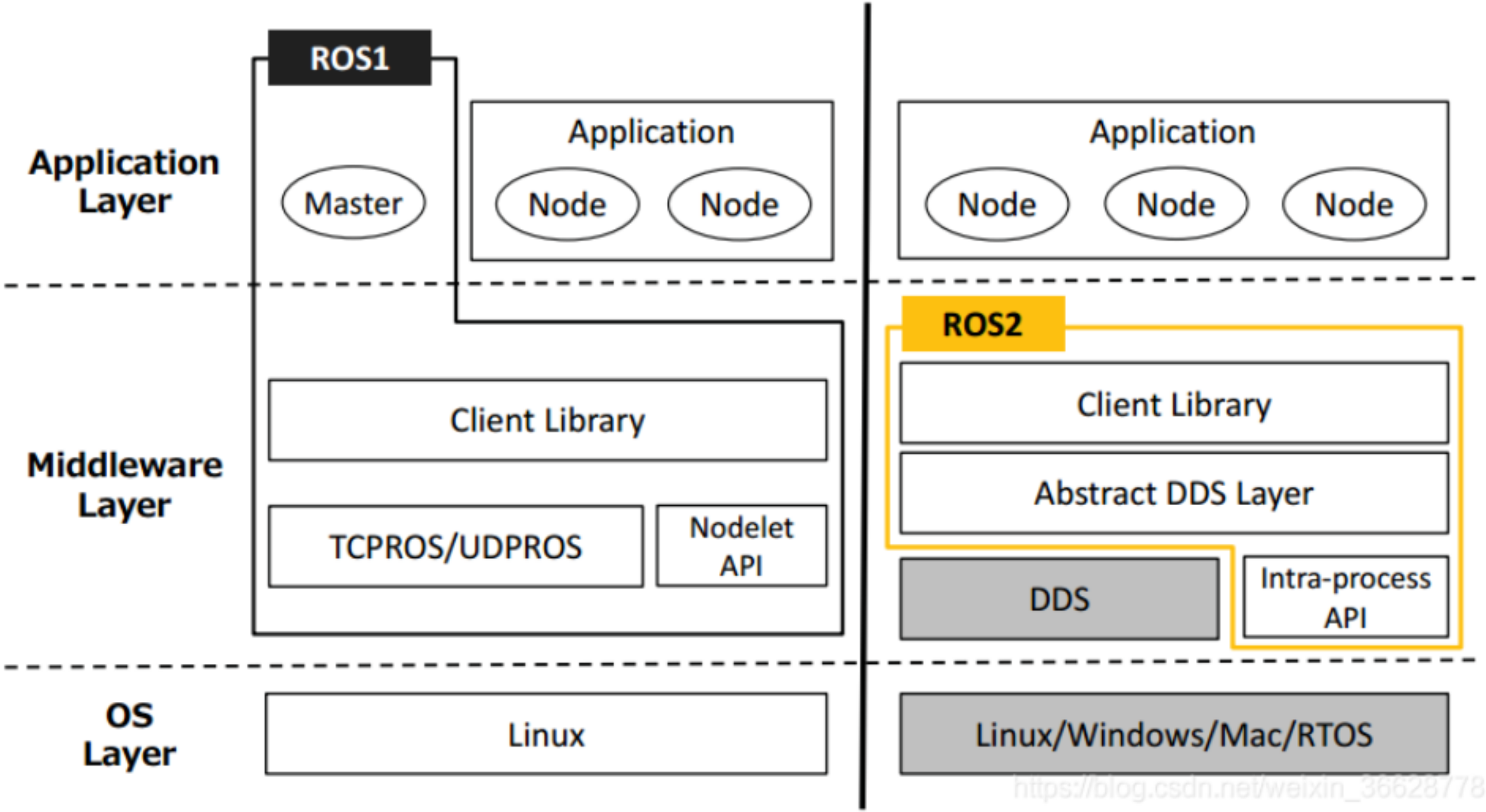
SOFA+ROS

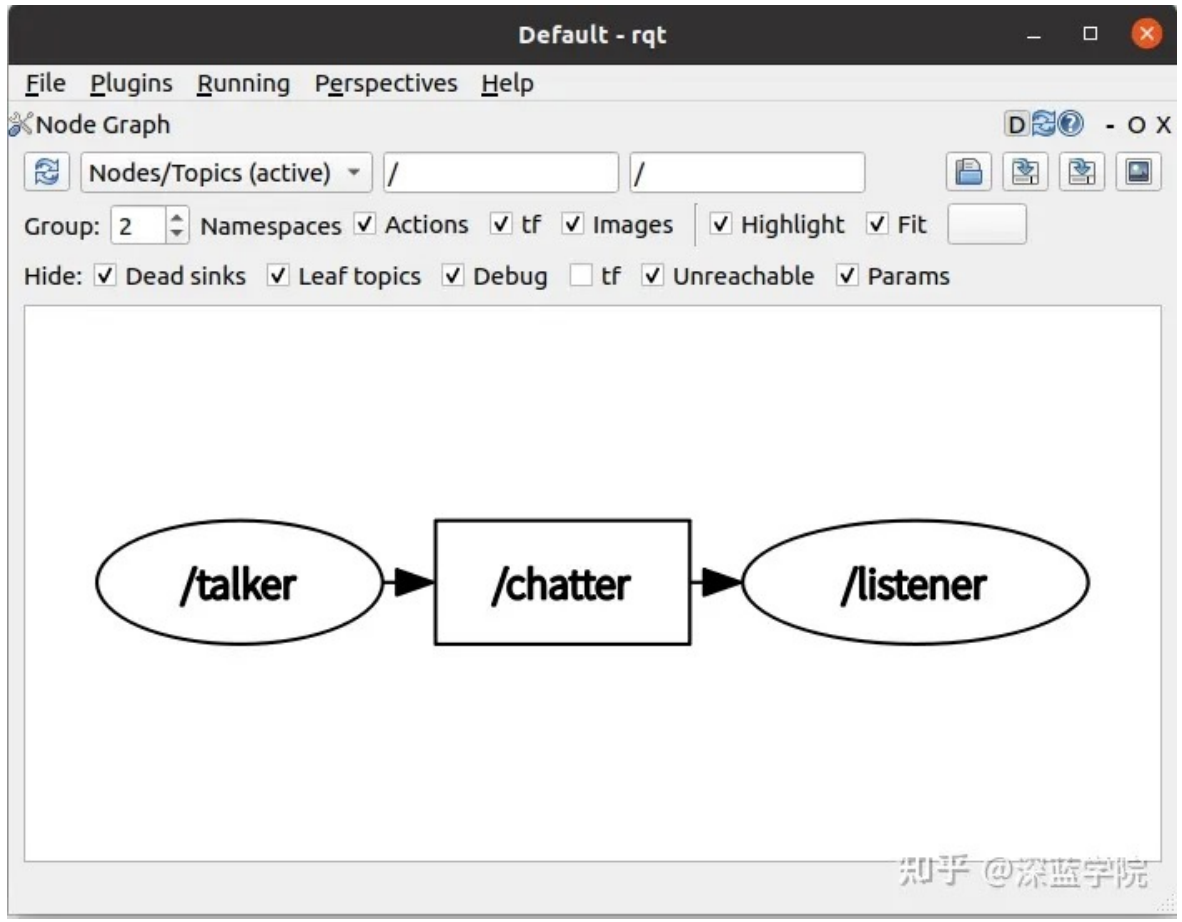
Thanks to Fabian Aichele, a very active developer around robotics in SOFA, a new plugin has just been released in open-source: the ROS Connector Plugin.

The ROS Connector Plugin is enabling a bi-directional communication between the SOFA framework and the open-source robotics middleware ROS (Robot Operating System). It allows the usage of SOFA-based simulations in combination with ROS-enabled software frameworks.

Video

ROS+SOFA




Default - rqt
File Plugins Running Perspectives Help
Node Graph
Nodes/Topics (active)
/
/
Group: 2 Namespaces Actions tf Images Highlight Fit
Hide: Dead sinks Leaf topics Debug tf Unreachable Params
/talker
/chatter
/listener
知乎 @深蓝学院

Demo

- https://www.youtube.com/watch?v=hkkG-Sgi9Sk

SOFA+ROS

- https://github.com/StanfordASL/soft-robot-control