

# CARDIOVASCULAR SIMULATOR

## Coronary catheterization training station

CARDIOVASCULAR SIMULATOR is a portable, high-fidelity device for cardiovascular angiography training that uses real catheters and guidewires, within an immersive virtual environment that provides suitable haptic feedback. The system enables physicians to practice endovascular procedures with authentic instrument interaction, across various clinical cases and anatomies, bridging the gap between traditional computer-based simulation and real-world catheterization labs.

**TRACKER  
DEVICE**

**TABLET**

Performance  
analytics  
dashboard  
interface  
on the tablet

system  
setup

**CATHETER  
+  
GUIDEWIRE**



## Key features

- Advanced physics engine that accurately reproduces vessel-instrument interactions
- Real patient anatomies representing a broad spectrum of navigational challenges
- Tactile feedback adjusted to the case and the dynamic situation
- Rigorous procedure representation to help the trainee understand the process and avoid typical mistakes
- Develops essential skills: instrument navigation, contrast injection, and fluoroscopic image interpretation.

Simulator expands access to practical cardiovascular training, enabling repeated practice without radiation exposure, disposable costs, or patient risk. It supports self-paced learning and structured curricula, helping institutions deliver modern, hands-on education with minimal infrastructure requirements. High portability enables effortless mobility of the solution, ad-hoc presentations at convenient locations, and allows users to perform such self-training at home.

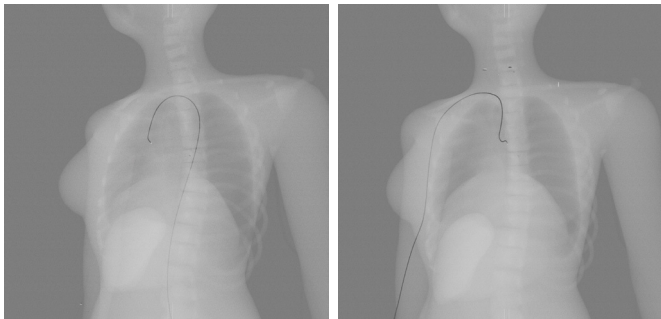
**CARDIOVASCULAR SIMULATOR empowers the next generation of interventional cardiologists and radiologists to train safely, effectively, and anywhere.**

## Progressive learning

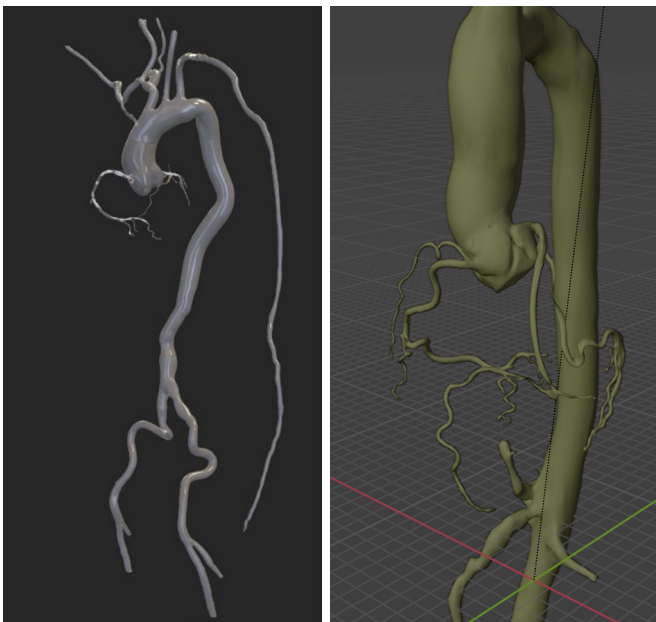
# Level 1

### Basic elements of the procedure

- key projection angles
- femoral/radial access
- selection of an adequate catheter size and shape
- basic wire handling and safety



# Level 2



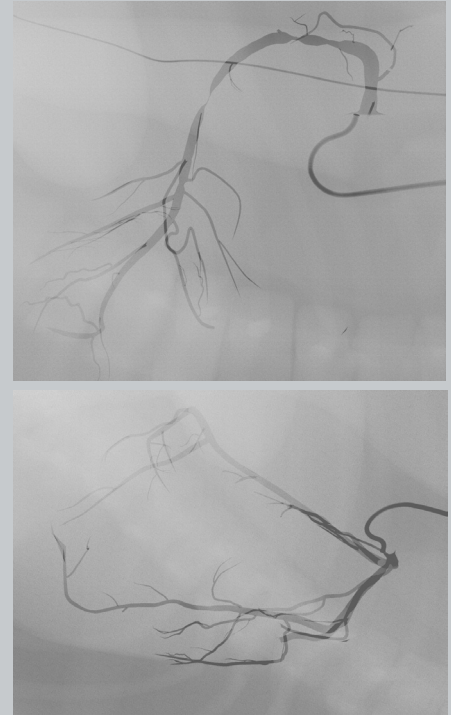
### Navigation

- aortic arch navigation
- tortuous anatomy
- selecting branches, using bends of the instrument
- firm placement of instruments inside the coronary arteries

## Coronary / Peripheral

- coronary engagement (LCA/RCA)
- contrast injection + fluoroscope projection interpretation
- catheter tip pressure monitoring

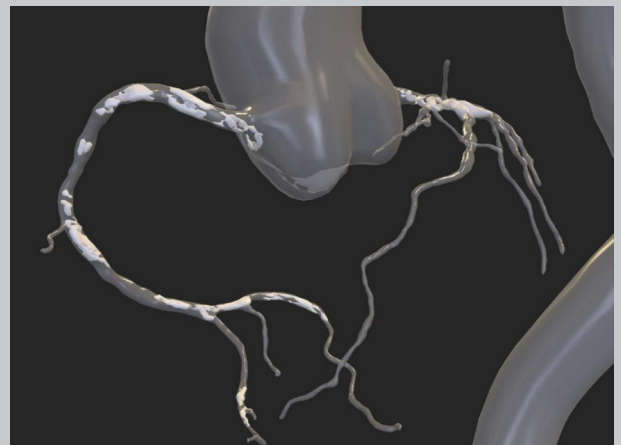
# Level 3



# Level 4

### Complex cases

- challenging anatomy, tight landing zones, severe tortuosity
- complications and time-critical decision points
- protocol adherence + error prevention



## Technical requirements

### CV-1 Tracker device:

USB-powered sensors station providing accurate real-time tracking of the catheter and the guidewire; includes steering module for C-Arm and injection interaction

### Tablet on a stand:

Running physical simulation of the instruments and the patient's body, displays the X-Ray view, realistically mimicking the fluoroscope display, in 60-120 fps (depending on specification)

## CARDIOVASCULAR SIMULATOR

Portable, high-fidelity simulator for cardiovascular angiography training — with adequate haptic feedback and real instruments.

CARDIOVASCULAR SIMULATOR lets physicians and trainees practice endovascular procedures using real clinical catheters and guidewires inside an immersive virtual environment. It bridges the gap between classic computer-based simulation and the real catheterization lab.

### What you can train

- Catheter and guidewire navigation and positioning
- Various instrument shapes and sizes
- Contrast injection workflow
- Avoidance of errors
- Proper reaction to adverse events and own errors
- Fluoroscopic image interpretation
- Procedural steps and protocol discipline
- Handling uncommon human anatomies

The simulator is currently in the final stages of development and user testing

### Realism that matters

- Physics-based modeling for realistic vessel–instrument interaction
- Haptics mimicking adequate friction and vessel contraction events
- Real patient anatomies covering a wide range of navigational challenges, including rare cases
- Genuine instruments to build true hand–eye coordination and procedural flow
- Rigorous procedure representation to help avoid common mistakes and support patient safety
- Self-training program designed by clinicians and tutors with many years of experience in teaching junior cardiologists



# Designed for education at scale

For hospitals, universities, and training centers, CARDIOVASCULAR SIMULATOR offers a portable, cost-effective alternative to conventional angiography simulators —without compromising training quality

- Modular scenarios curated by experienced physicians
- Progressive learning: from basic vascular access to complex coronary and peripheral interventions
- Built-in performance analytics with objective feedback on:
  - safety
  - precision
  - efficiency

## Safe. Repeatable. Built for Training Programs.

Deliver consistent, hands-on angiography training without:

- radiation exposure
- disposable consumable costs
- any patient involvement or risk

CARDIOVASCULAR SIMULATOR is designed for education at scale: it supports self-paced practice, instructor-led sessions, and structured curricula—with minimal infrastructure requirements. Its portable setup enables easy deployment across classrooms, simulation labs, and partner sites, making it ideal for cohort training, skills bootcamps, and outreach demos.

Designed for hospitals,  
universities,  
training centers,  
and clinical workshops



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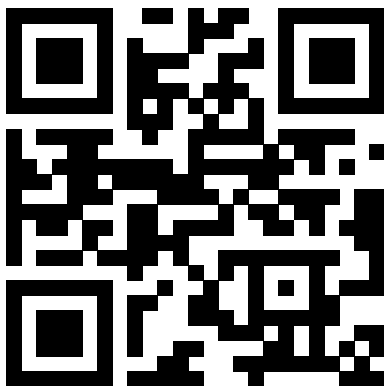
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