(a) Rough Localization

Chirps

Frames

Ch. 1

Ch. 2

Ch. 8

Virtual Antennas

FFT

Azimuth Angle: 4.55207
Range: 0.991129

Range (m)

Angle of Arrival (degree)

Object Detection

ECG Monitor

TI-AWR 1843
77-81GHz with Tx2Rx4

Subject with Random
Body Position

Data
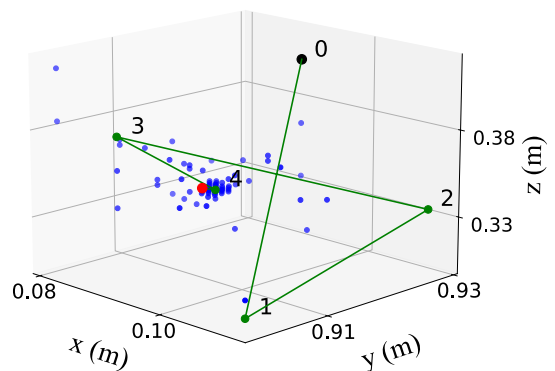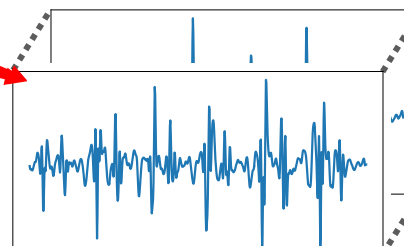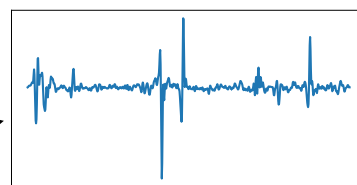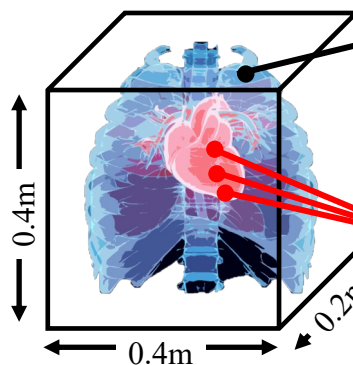Matrix

Provide Initial State for CFT

(b) Cardio-Focusing and -Tracking (CFT)

● Initial State   ● CF Point   ● Incumbents   ● Evaluated Points

z (m)

0.38

0.33

x (m)

y (m)

0.08   0.10

0.91   0.93

Search for Cardio-Focused (CF) point

DFO

0.4m

0.4m

0.2m

Search Space

Low-SNR Signals

High-SNR Signals

Convert to
Spectrogram

(c) Deep Learning Model

Frequency (Hz)

Time (s)

DNN

ECG Outputs