

PFEIFER: A MATLAB Based Platform for Preprocessing Cardiac Electrograms

B. Zenger^{1,2}; W. Good^{1,2}; A. Rodenhauer¹; R. MacLeod, PhD^{1,2}

¹ Scientific Computing and Imaging Institute, University of Utah, Salt Lake City, UT

² Department of Bioengineering, University of Utah, Salt Lake City, UT

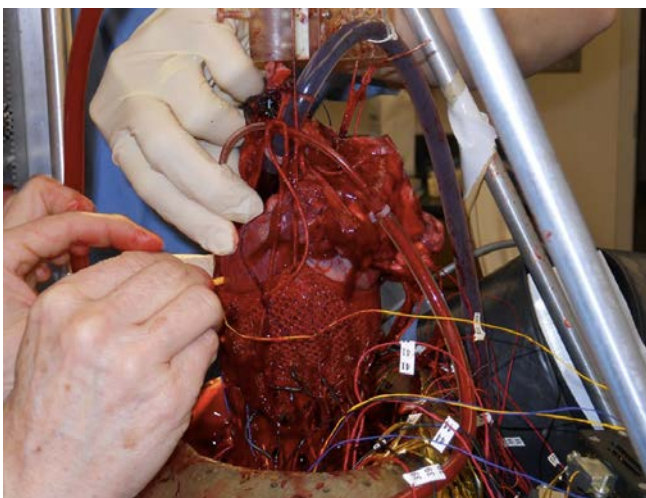


PURPOSE OF PFEIFER

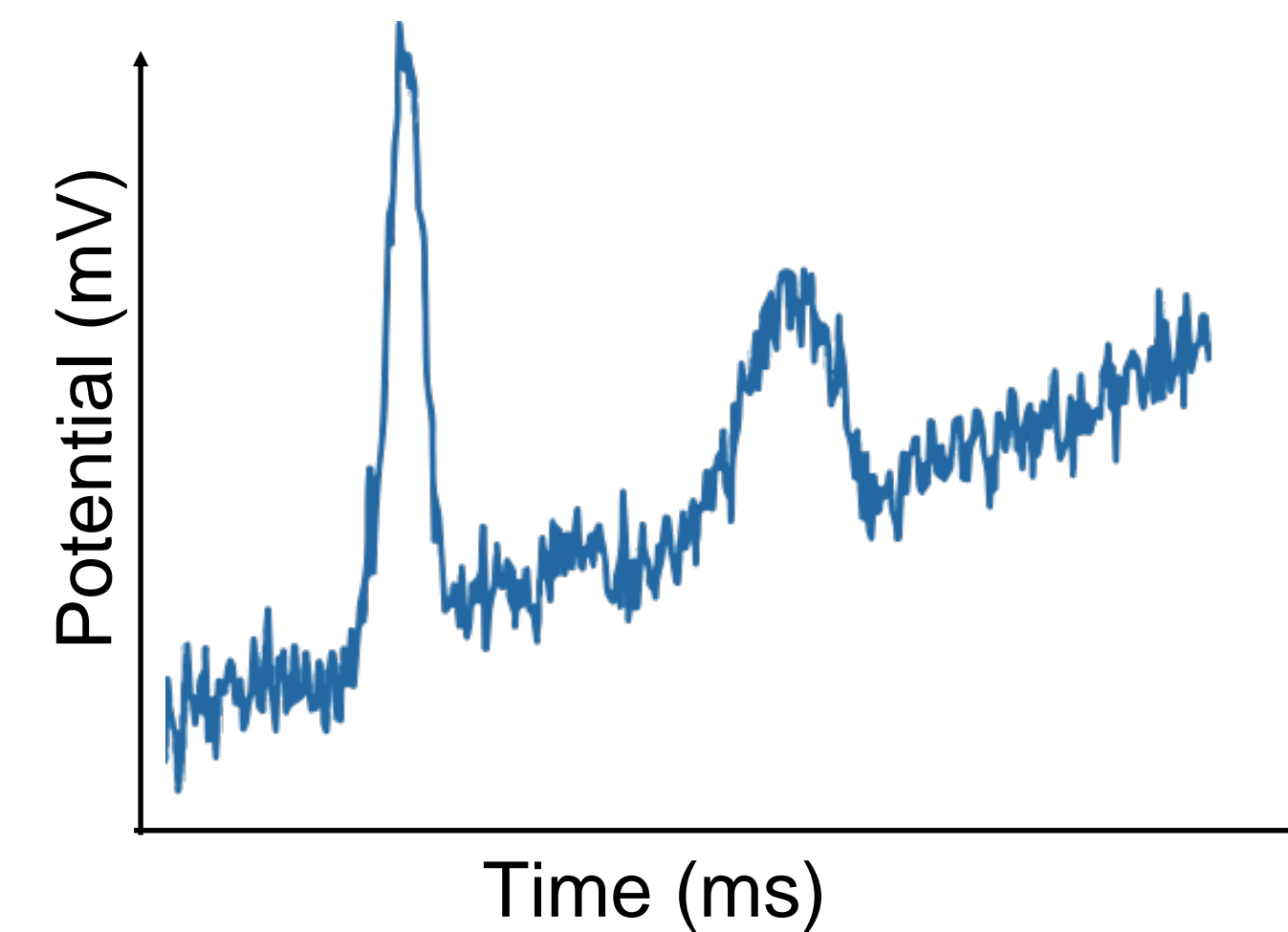
Patient recordings



Animal experiments



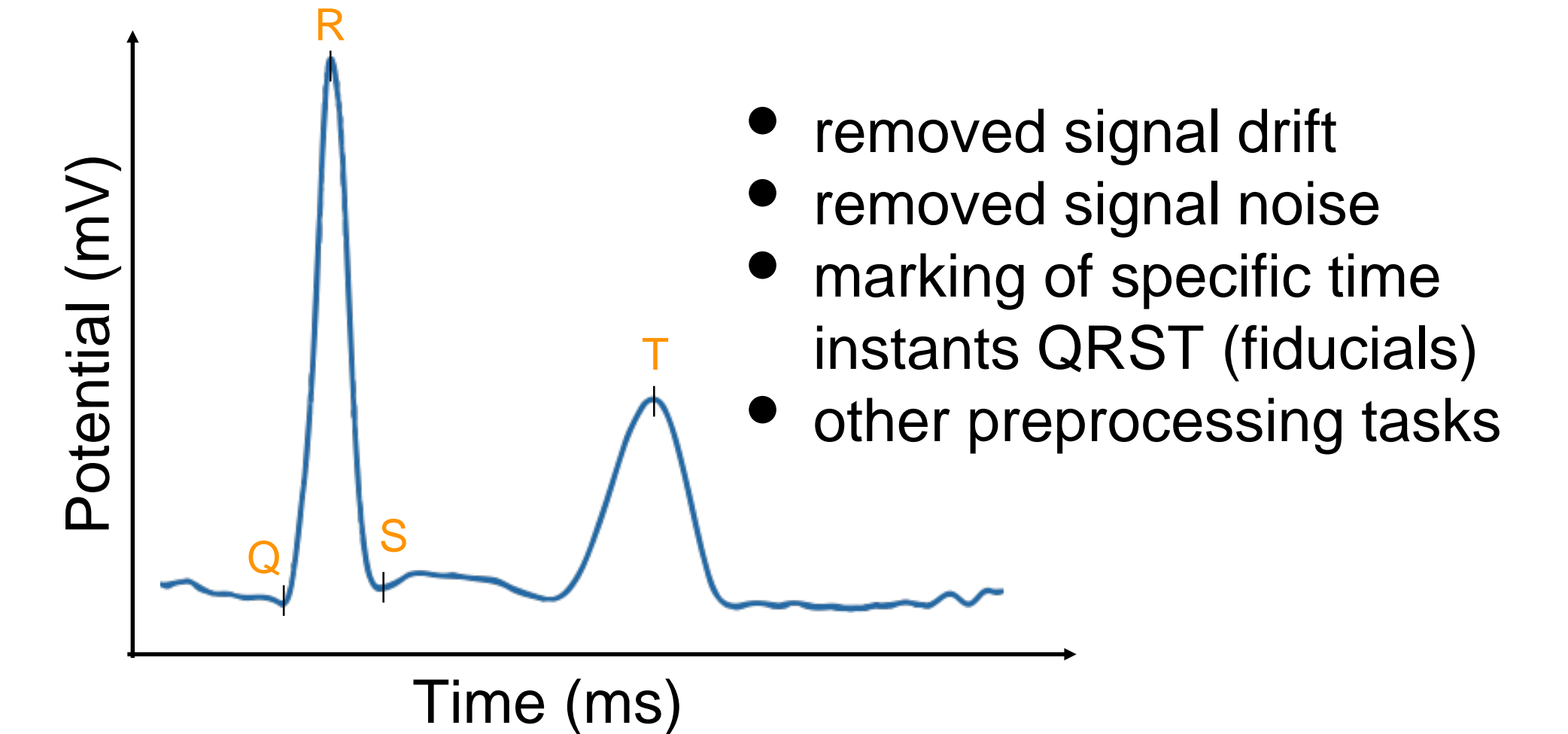
Raw cardiac time signals



GUI based cardiac signal processing toolbox



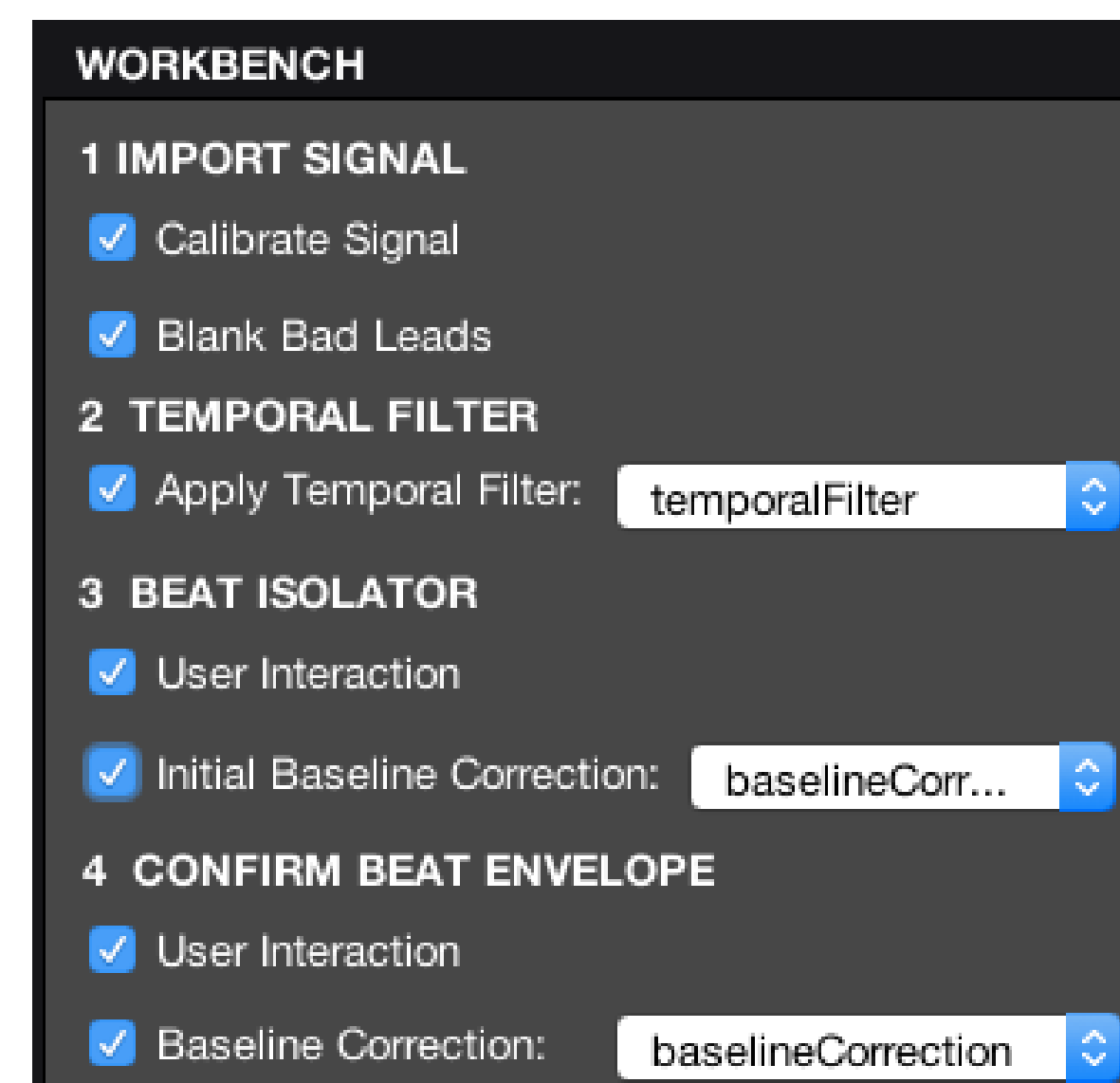
Processed cardiac time signals



TYPICAL WORK FLOW

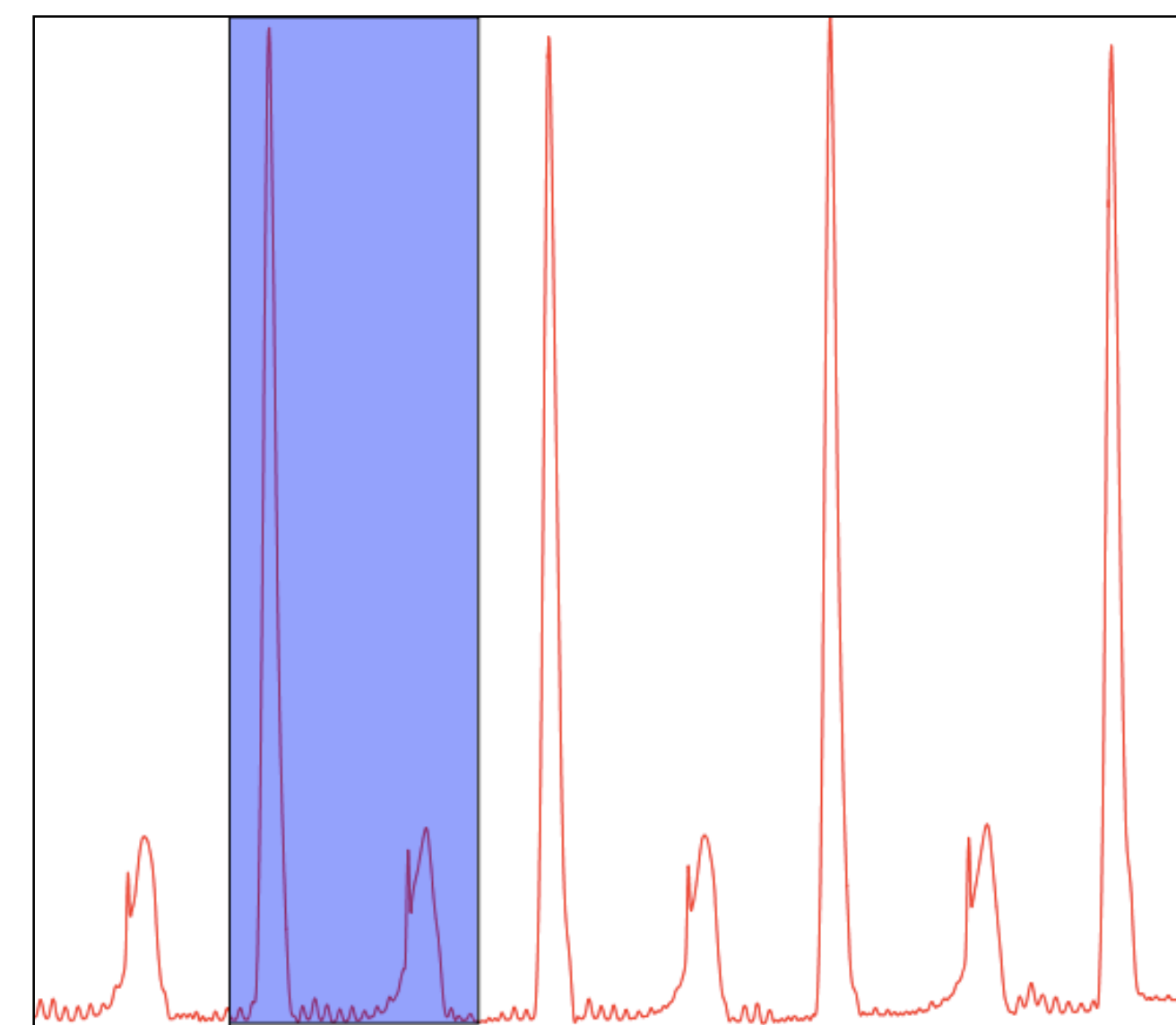
Setup PFEIFER

Import cardiac time signals & choose processing tasks.



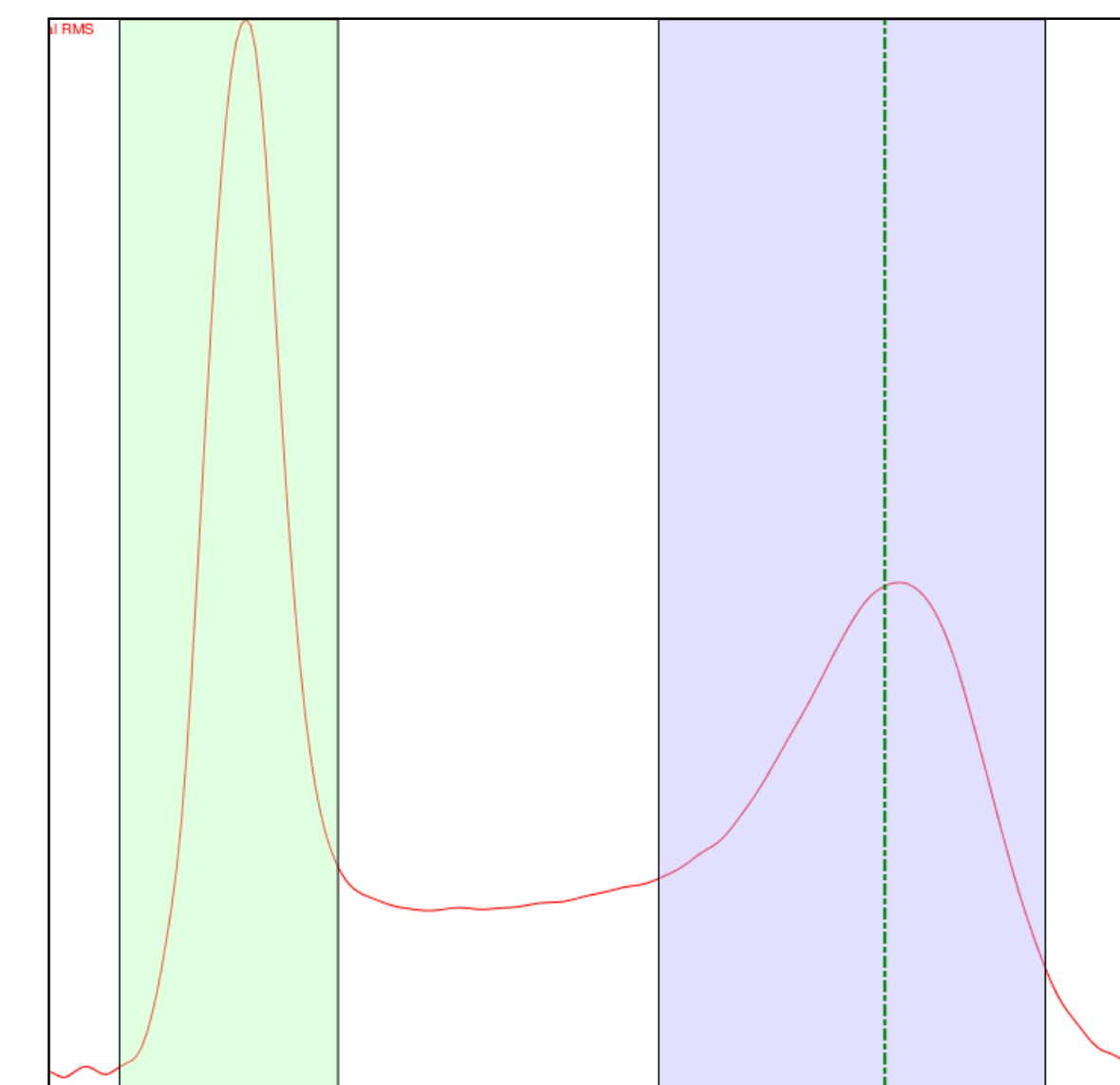
BEAT ISOLATION:

Use your mouse to select the start & end of a beat in RMS of signal.



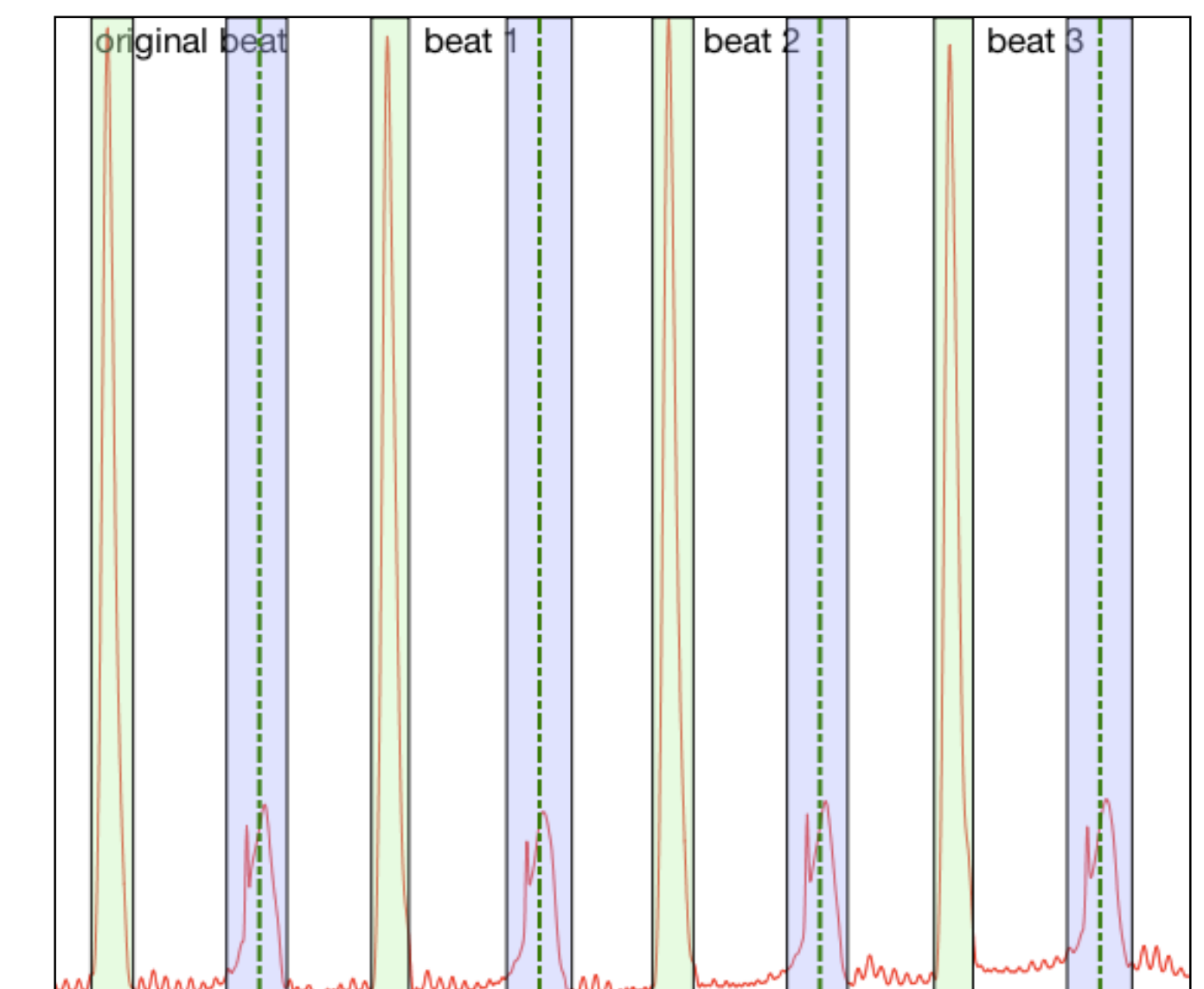
MANUAL FIDUCIALIZING:

Mark fiducials within a beat using your mouse.



AUTOMATIC FIDUCIALIZING:

Manual fiducial is used to automatically fiducialize the next 30-50 beats



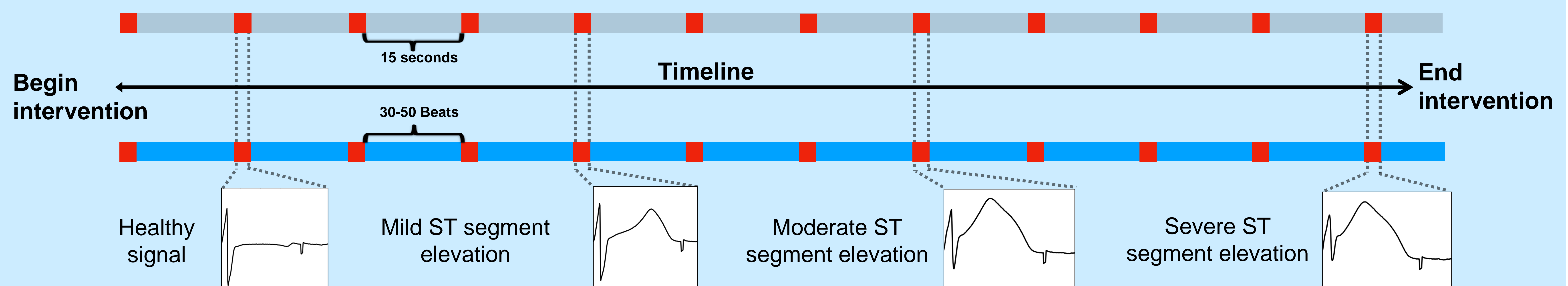
BENEFIT OF PFEIFER

The manual approach:

Mark fiducials manually (■) once every 15 seconds. Leave beats in between unfiducialized (■).

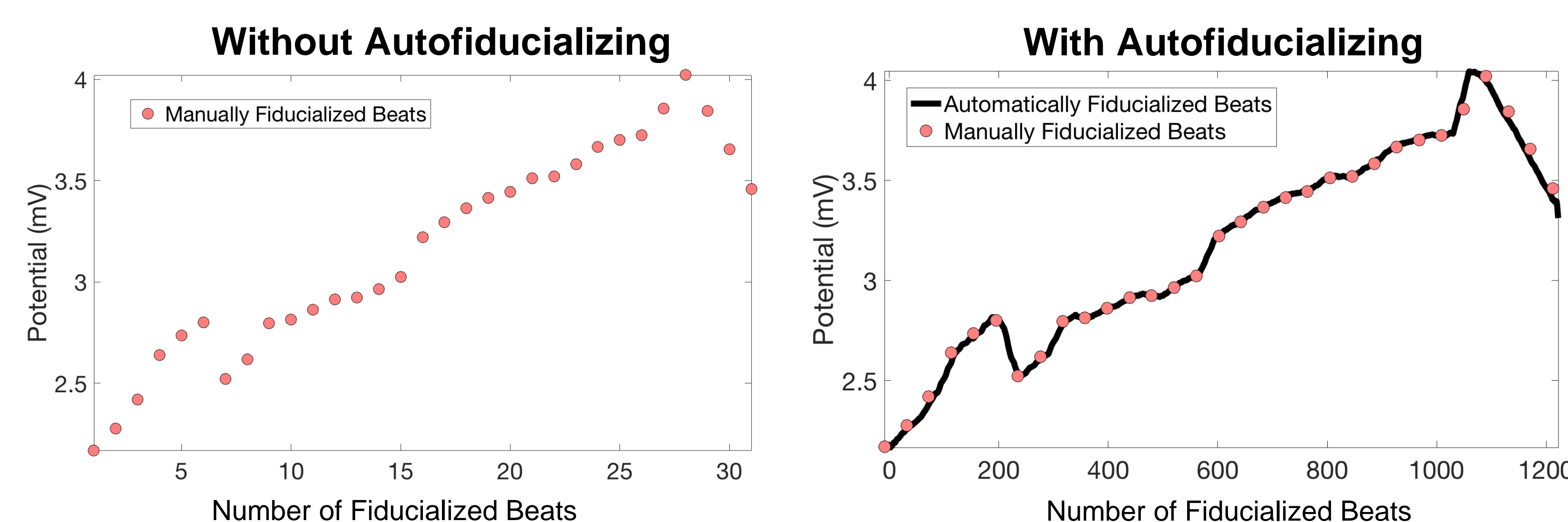
The PFEIFER approach:

PFEIFER autofiducializes (■) beats in between manually fiducialized beats (■).



VALIDATION

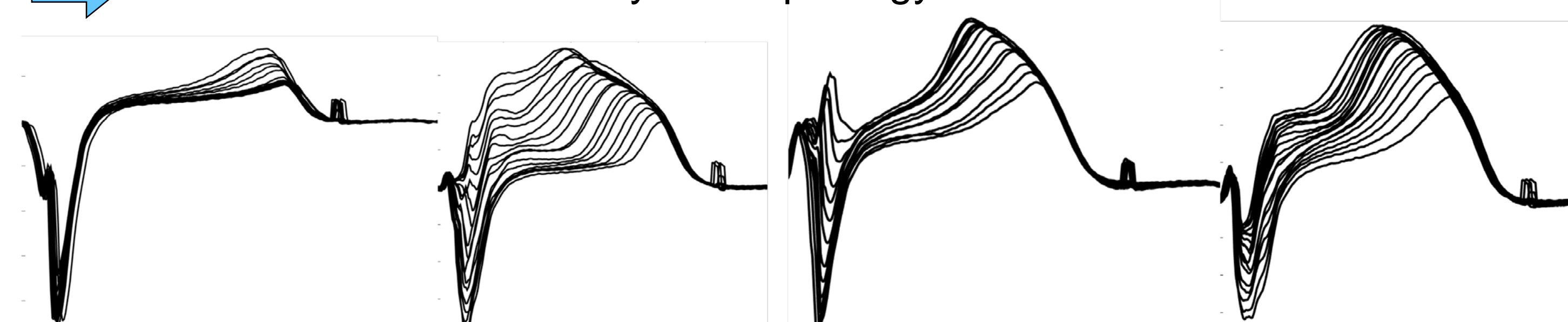
Tracking of the ST segment over an intervention



ADVANTAGE OF OUR METHOD

Alternatives to manual fiducializing: Rule-based fiducializing

Problem: Beats can vary in morphology:



Rule based fiducializing can fail, especially on ischemic electrograms

Acknowledgements:

Support for this work was provided in part by the NIH/NCRR Center of Integrative Biomedical Computing (CIBC), 2P41 RR0112553-12