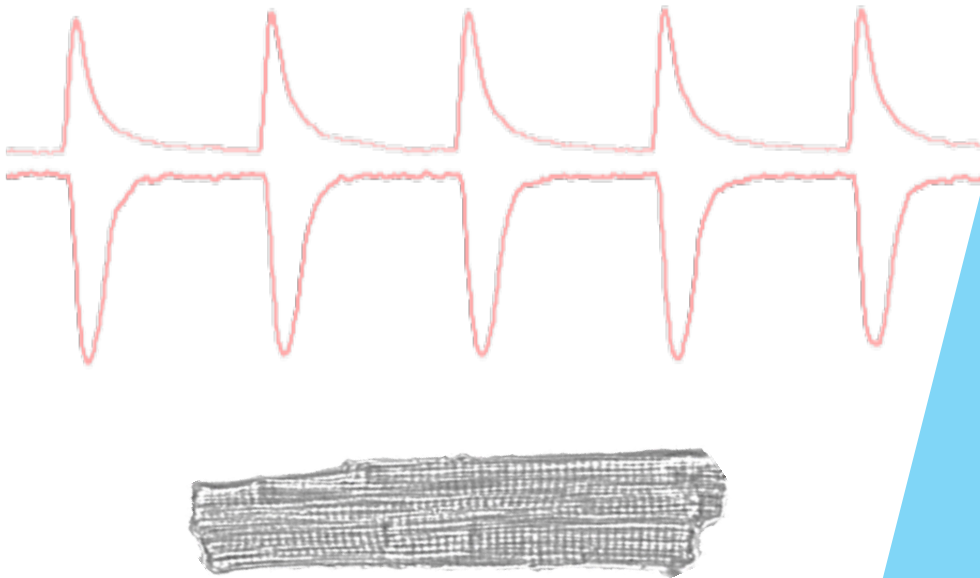# Record Calcium & Contractility from Intact Cardiomyocytes

Complete real-time, turnkey system

Fast, quantitative calcium, sarcomere shortening, and cell length

Intuitive software for data acquisition and transient analysis

IonOptix Calcium & Contractility System

The IonOptix Calcium & Contractility System offers simultaneous acquisition of fluorescence photometry with digital cell geometry measurements.

All components are designed and engineered to work as part of a complete and integrated workstation for precise, synchronous data acquisition.

Systems are fully installed on-site with extensive training so researchers can be ready to collect data within days of delivery. And customers can rest easy with unlimited support for the system lifetime.
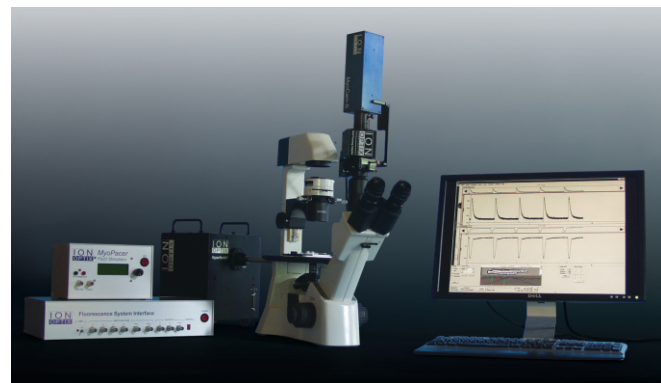
Typical C&C System with MyoPacer cell stimulator, HyperSwitch, and IonWizard acquisition module

Acquisition Features

- **Maximum sampling rates** of 1000 Hz for cell length and sarcomere data; 1000 Hz for single excitation calcium; 250 Hz for ratiometric dual excitation calcium

- Separate acquisition time periods defined as '**epochs**' that can each include independent sampling rates and analog data. Seamlessly switch between epochs automatically or with a trigger

- **Cell length** algorithm uses image intensity or derivative of image intensity to detect left and right edges

- **Sarcomere spacing** algorithm uses fast Fourier transform for reliable, reproducible real-time measurements

- Analog monitoring voltages and **synchronization signals** (e.g. pacing sync) collected simultaneously

Analysis Parameters

- **Departure/return velocity (d/dt):** maximum/minimum velocity reached on the rising/falling phases of the transient

- **Peak height:** can be expressed as absolute peak height or % of the baseline (e.g. % shortening for length data)

- **Time to % peak or time to % baseline:** time required for transient to reach a specified level on the rising and falling phases (e.g. TP90 and TR90)

- **Exponential fit:** single exponential curve fit and associated time constant (tau), useful for characterizing the rate of calcium re-uptake

- **Area under the curve:** useful for measuring total calcium exchanged

- **Event averaging**: average data to remove noise from repetitive signals

SarcLen

Transient Analysis
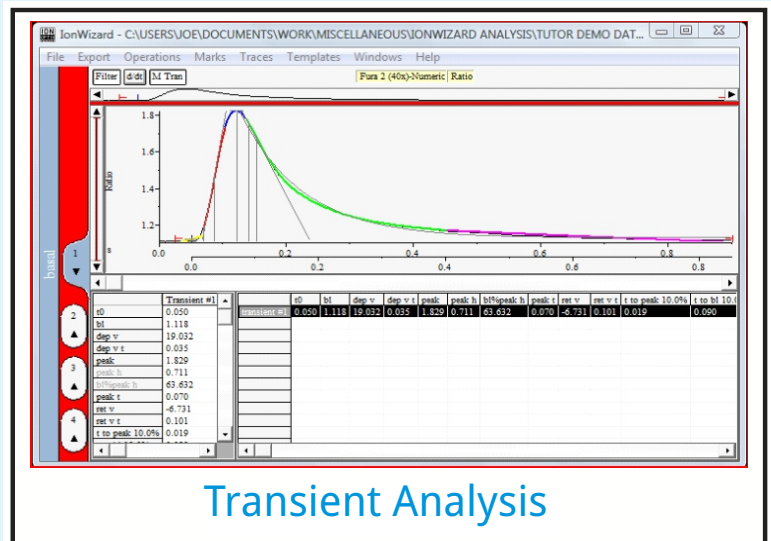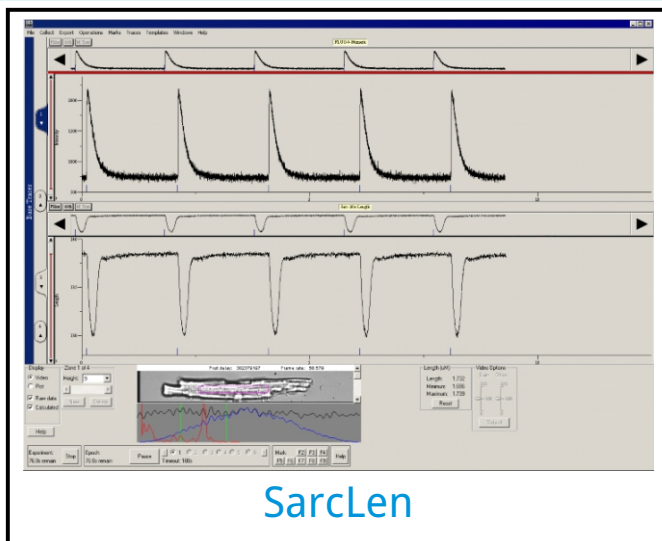
Select Publications

Cardiac resynchronization therapy restores sympathovagal balance in the failing heart by differential remodeling of cholinergic signaling.

DeMazumder, Deeptankar, et al. Circulation research 116.10 (2015): 1691-1699. DOI: 10.1161/CIRCRESAHA.116.305268

Mechanochemotransduction during cardiomyocyte contraction is mediated by localized nitric oxide signaling.

Jian, Zhong, et al. Science signaling 7.317 (2014): ra27. DOI: 10.1126/scisignal.2005046