



## Vessel Diameter & Flow Recording System

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IonOptix has developed its **Vessel Calcium & Dimensioning Recording System** over many years of collaboration with top vascular researchers. We take pride in a line of precision products that are application driven and built to meet the needs of a demanding research environment. Since its inception in 1990 IonOptix has installed hundreds of high performance, turn-key systems in research laboratories worldwide.

Our new [VesAcq](#) dimensioning software offers a simpler user-interface, more precise control and enhanced functionality to acquire vessel diameter. Some new features and improvements over simple contrast-based edge detection are:

**Multiple ROIs** - allow measurement of up to four regions along the vessel at the same time.

**Line averaging** - unlike convention "edge detection", where contrast information is evaluated on a single line, VesAcq averages contrast over all of the lines within a user-defined region to minimize the contribution of contrast that doesn't occur over all lines. Images no longer need to be super-saturated to drown out the contrast from remnants of blood, fat, folding, etc., making your measurements simpler and more reliable.

**Auto-gained contrast** - simplifying the user interface, contrast information is automatically maximized within the contrast window to enable precise control of thresholds.

*Real-time calculations of:*

- Inner/outer **diameter**
- Left/right/average **wall thickness**
- Inner/outer/cross-sectional **area**
- Media/lumen ratio**

The endothelial response to flow-induced stress (e.g., the generation and secretion of nitric oxide) is an important modulator of vascular tone and function, linking vasodilation and constriction to the dynamics of fluid flow. IonWizard's [FloAcq](#) acquisition module is the first to perform real-time calculations of important indicators of arterial flow, including shear stress. The following lists some FloAcq outputs and how they could be applied to the characterization of vascular physiology and function:

**Mean pressure**

**Flow velocity**

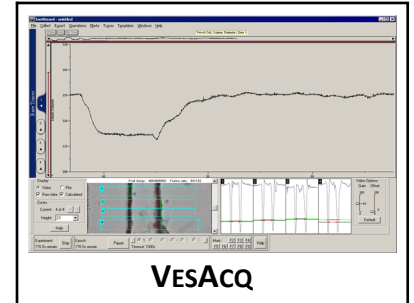
**Vessel wall shear stress** - a characterization of the frictional drag exerted on arterial walls during flow. Many physiological functions are influenced and promoted by this biomechanical force. Normal levels of shear stress serve to maintain wall physiology. High shear stress triggers vascular dilation in order to regulate the mechanical forces exerted on arterial walls.

**Vascular resistance** - a definition of the force opposing the movement of solution through a vessel. It is inversely related to the vessel diameter. A greater vascular resistance will require a greater degree of vasodilation in order to maintain constant pressure within the vessel.

**Reynolds number (Re)** - describes whether the flow is either turbulent or laminar. A large Re suggests turbulence, where nonaxial flow instabilities such as vortices result from high flow volume, high temperature, high flow velocity, branch points, etc. At low Re, where flow is dominated by viscous forces, laminar flow will move in parallel velocities throughout the lumen of the vessel.

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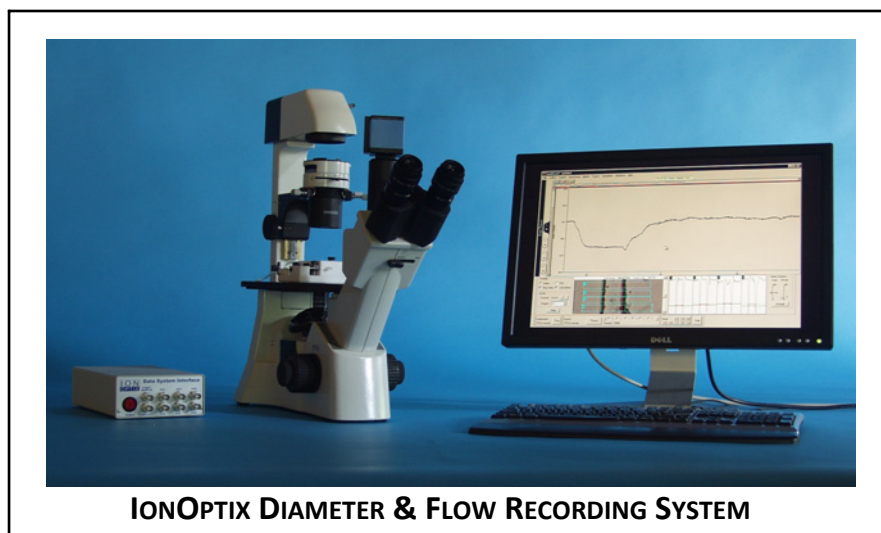
The list of components comprising a complete, integrated workstation can be extensive. Our complete systems are built from components designed to work seamlessly with one another, providing completely synchronous and accurate data acquisition. Our systems begin with [IonWizard](#), our core software. IonWizard's central functions can be expanded through the [VesAcq](#) and [FloAcq](#) acquisition modules to record inner and outer vessel diameter, shear stress and many other dimensioning and flow related parameters. IonWizard communicates directly with two root devices, the video acquisition camera and our data system interface ([DSI](#)). Our vessel systems come equipped with the [VesCam](#), a USB-interfacing CCD video system for visualizing and dimensioning vessels. The data system interface provides a hub for communicating with all peripheral hardware devices, synchronizing data acquisition through a suite of analog and digital connections. Depending on your choice of pressure myography hardware, IonWizard will perform root level communication enabling control of inlet and outlet pressures.



Using our interface box, the [DSI](#), and a system that allows the pressurization of microvessels, systems that are sold by [DMT](#) or [Living Systems](#), we can provide real-time recording of all vessel myograph outputs, for example pressure, force, temperature and pH, as well as diameter and flow. We'll work with the manufacturer your myograph system to provide an integrated workstation capable of accurate, synchronized data acquisition.

No system would be complete without a microscope. We can equip your microscope with all the necessary couplings to attach your IonOptix hardware or we can supply the microscope as well. We offer a high quality [Motic inverted microscope](#) configured to our specifications. Our microscope package offers upscale features such as uniform Koehler illumination and infinity corrected optics and high transmittance objectives at a reasonable price. Our microscope package guarantees you'll have the right equipment for precise measurements.

Equipped with the latest computers, we assemble and test all components at our facility before shipping. Every system includes a visit to your lab for installation and training. When we install our complete systems we use your preparations to help get you started as quickly as possible. And when you need assistance we offer unlimited phone and email support for the lifetime of your system.





*Standard Components:*

**Software**

[IonWizard-Core and Analysis](#)

[VesAcq Vessel Dimensioning Acquisition Module](#)

[FloAcq Vessel Flow Characteristics Acquisition Module](#)

**Cameras and PMTs**

[VesCam: USB-Interfacing CCD Video System](#)

**Interfaces**

[Data System Interface](#)

**Microscope**

[IonOptix/ Motic Fluorescence Microscope Package](#)

*Optional Components:*

**Cameras and PMTs**

[MyoCam-S Digital CCD Video Camera](#) (replaces VesCam Video System for faster acquisition)

Please visit us at [www.ionoptix.com](http://www.ionoptix.com) for more information.

Email your IonOptix representative at [info@ionoptix.com](mailto:info@ionoptix.com) and have them tailor a system specifically to your application.