For applications such as tracking and classification of cellular drug absorption and delivery or quantifying the presence of tagged nanobeads within tissue samples, hyperspectral imaging represents a valuable extension of traditional research techniques that can utilize existing optical microscopes available within the laboratory.

With research samples positioned along the microscope stage, spectral imaging yields critical analytical information with the addition of a hyperspectral sensor attached with a C-mount adapter of the exit port of the microscope. With the microscope stage moving the sample area in a "push-broom" manner, hyperspectral imaging simultaneously yields precise information for all wavelengths across the complete spectral range of the sensor. The hyperspectral datacube is a data set that includes all of the spatial and spectral information within the field of view. Researchers are thus able to more thoroughly evaluate and interrogate microscopic structures and greatly enhance knowledge of the spectral composition of these samples.

Key advantages of hyperspectral microscopy include:

- Derive the spectral signature for every point within the scanned field of view for material classification

- Discrete color measurement and image rendering of tagged nanoparticles

- Color render the image scene based on an established library of known spectral signatures or disease conditions

- Identify and evaluate features based on fluorescence characteristics

- Generate wavelength-specific criteria for screening the presence of nanobeads and structures of interest
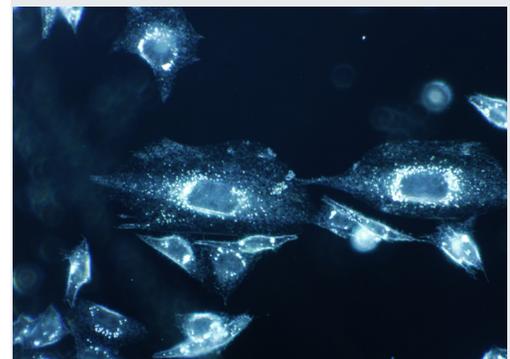
- **Cellular Spectroscopy**

- **Disease Diagnosis**

- **Drug Discovery**

- **Fluorescence**

- **Nanobead Research**

- **Nanoparticle Research**

Headwall is the world's leading manufacturer of hyperspectral imagers (Hyperspec®) for a wide range of industries including remote sensing, advanced machine vision, precision agriculture, and others. The Company also manufactures OEM spectrographs and spectral engines that are exceptionally precise with respect to high spectral and spatial resolution and signal throughput.

The core technology fundamental to these products is the holographic diffraction grating, which Headwall manufactures to exacting dimensions and tolerances and to customer specification. This allows for small and rugged optical imaging instruments that deliver aberration-corrected performance and a very wide field-of-view. Used in Headwall's *concentric-style* imagers along with mirrors, the designs are simple yet elegant and feature no moving parts.

In addition to hyperspectral, Headwall also manufactures Raman imaging instruments that are available in a wide range of laser excitation wavelengths. Raman Explorer and Raman Discovery are very well suited for chemical imaging applications as well as biotechnology and medical applications.

| Hyperspectral Ranges | |
| --- | --- |
| UV-VIS | 250-825nm |
| VNIR | 380-1000nm |
| Extended VNIR | 550-1700nm |
| NIR | 900-1700nm |
| SWIR | 950-2500nm |
| MWIR* | 3-5 microns |
| LWIR* | 8-12 microns |
| *MWIR and LWIR available upon request* | |



| Raman Explorer | |
| --- | --- |
| 248nm | single input |
| 355nm | single input |
| 532nm | single input |
| 532nm/658nm | dual input |
| 642nm | single input |
| 785nm | single input |
| 785nm | dual input |
| 830nm | single input |
| Raman Discovery | |
| 532nm | dual input |
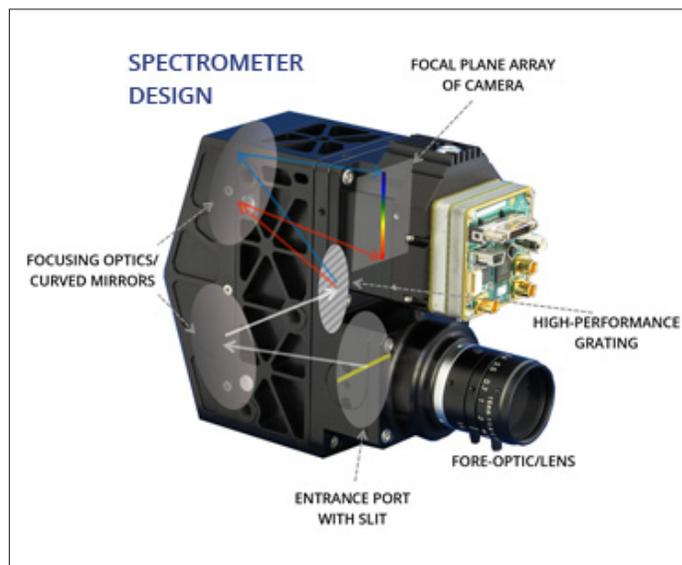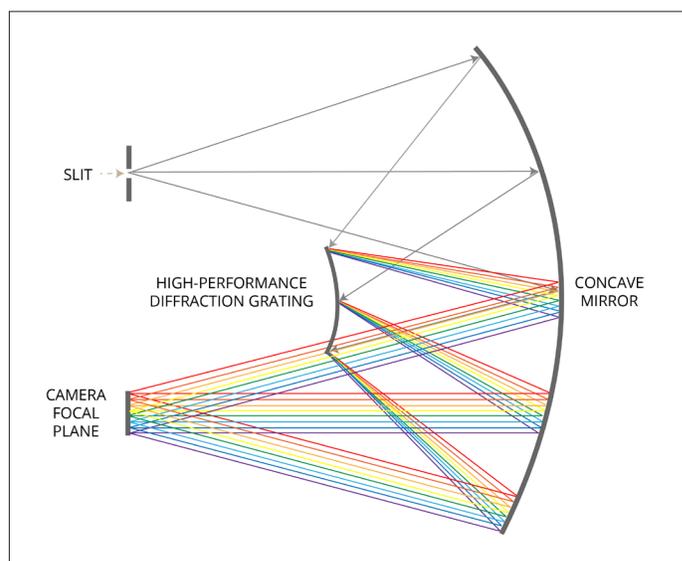


**About Headwall Photonics:** Headwall is the leading designer and manufacturer of imaging spectrometers and spectral instrumentation for industrial, commercial, and government markets. Headwall's high performance spectrometers, spectral engines, and holographic diffraction gratings have been selected by OEM and end-user customers around the world for use in critical application environments. As a pioneer in advanced, patented optics technology, Headwall enjoys a market-leading position through the design and manufacture of spectral instrumentation that is customized for application-specific performance.

**Headwall**