Comparison of spontaneous Raman spectrometers

We tested several spectrometers for spontaneous Raman spectroscopy as a rapid biological phenotyping tool. We analyzed the spectra from each instrument, comparing the resolution, signal-to-noise ratio, and ability to resolve peaks to determine the best fit for our research.

Purpose

At Arcadia, we're interested in using spontaneous Raman spectroscopy as an agnostic, high-throughput tool for biological phenotyping. To implement this approach effectively, we evaluated a variety of Raman spectroscopy systems to determine which would best align with our research requirements. By testing the same research-relevant specimens across all instruments, we could directly compare their performance characteristics, including resolution, sensitivity, and signal-to-noise ratios under real experimental conditions. To facilitate data processing and characterization, we also created an open-source Python package, [ramanalysis](https://github.com/Arcadia-Science/ramanalysis), to process, normalize, and help interpret the spectral data from different manufacturers. We hope that others getting started with similar systems can use this notebook and the open-source Python package associated with it to assist in their analyses. Our analysis has several

caveats based on the acquisition parameters and samples we used, and as such, isn't intended to generate a definitive ranking or absolute comparison of the instruments themselves.

View the notebook

In the future, we hope to host notebook pubs directly on our publishing platform. Until that's possible, we'll create stubs like this with key metadata like the DOI, author roles, citation information, and an external link to the pub itself.

Contributors (A–Z)

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