



## Multidimensional Spectrometer

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**The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a spectrometer that is capable of measuring multidimensional infrared, visible and ultraviolet spectra in a straightforward manner.**

### Overview

Over the last eight years, academic researchers have been developing a new set of spectroscopic techniques that are multidimensional versions of visible and infrared spectroscopies, such as two-dimensional infrared (2D-IR) and visible (2D-Vis) spectroscopies. These 2D optical techniques are in many ways similar to 2D NMR spectroscopy, which has become a powerful analytical and diagnostic tool since being commercialized 20 years ago.

These techniques make it possible to determine whether two molecules, or two pieces of a molecule, are interacting with one another. The techniques can also be used to quantify the “coupling,” or degree of interaction. By measuring the coupling, unique information about a molecule’s structure and its surrounding environment can be determined. The techniques can be applied, for example, to identify small molecules in an industrial synthesis, to study protein structure and dynamics, or to identify drug/protein interactions.

Scientists are increasing the uses of these techniques, but they have been limited thus far because they are difficult to implement. An improved spectrometer that can easily measure multidimensional spectra is needed before the techniques can be widely adopted.

### The Invention

UW-Madison researchers have developed a spectrometer capable of measuring multidimensional spectra in a straightforward manner. The spectrometer utilizes a pulse shaper and a simple collinear geometry so that alignment is easy and data collection can be automated. Researchers can simply insert their samples and select one of several options for collecting 2D IR spectra. With this invention, along with some engineering and computer programming, the powerful new optical techniques are ready to be commercialized in a user-friendly apparatus that will have broad appeal among researchers.

### Applications

- Facilitates collection of 2D infrared and visible spectra
- Provides multidimensional spectroscopic measurements in the infrared, visible and ultraviolet regions of the electromagnetic spectrum
- Facilitates measurement of inter- and intra-molecular interactions that can be used to study molecular binding, structures or kinetics

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- Data collection is automated.
- Simple alignment procedures for easy installation and maintenance.



## Additional Information

### For More Information About the Inventors

- [Martin Zanni](#)

### Tech Fields

- [Analytical Instrumentation, Methods & Materials : Spectroscopy](#)
- [Research Tools : Detection](#)
- [Research Tools : Protein interactions & function](#)

For current licensing status, please contact Michael Carey at [mcarey@warf.org](mailto:mcarey@warf.org) or 608-960-9867

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