

# JY Division Information

---

## Fluorescence

## Products and Technologies of the Fluorescence Division

Ray Kaminski

---

The Fluorescence Division of Jobin Yvon (JY) supplies the scientific community with the most sensitive instruments available anywhere. Though most customers are in biochemical research, laboratories in other fields, such as materials science, analytical chemistry, pharmaceuticals, and many more benefit from the highest performance that comes only with JY's spectrofluorometers.

---

## 1 Introduction

The Spex® Fluorescence Division of Jobin Yvon (JY) supplies the highest quality and most sensitive spectrofluorometers available in the world. Our instruments expose the secrets of cells, membranes, and metabolism by characterizing biological luminescence. They find applications in manufacturing quality control, environmental analysis, pharmaceuticals development, cosmetics testing, and fundamental research into the nature of molecular bonding and motion.

For decades, the names Spex® and JY have been synonymous with fluorescence measurements. We deliver the finest instruments and accessories for detecting and analyzing luminescence of all types, throughout the ultraviolet, visible, and near-infrared light spectrum. All instruments are fully automated, controlled by advanced software, and take advantage of the highest quality reflective optics made famous by JY.

---

## 2 What is a Spex® Spectrofluorometer?

A spectrofluorometer is a research instrument that bathes samples in light. The light excites the sample's atoms, ions, or molecules, storing energy, that is then released as light of a different, longer, wavelength. Analysis of the characteristics of the emitted light, and comparison to the exciting light, tell us much about the sample, such as distances between molecules, size and shape of molecules, or even the local chemical environment of the sample.

### 2.1 Fluorolog®

The Fluorolog® series of spectrofluorometers targets researchers who need the most flexible, adaptable instruments. The Fluorolog®'s versatile modular construction encourages experimental improvisation, for example, to characterize powders, solutions, crystals, thin films, or cellular suspensions. The most demanding fluorescence measurements are addressed, whether to measure polarization to assess molecular environments, cryogenic luminescence of glasses, nanomaterials, phosphorescent cellular probes, photoluminescence and photoluminescence excitation, or emissions in the ultraviolet or near-infrared region for semiconductor improvements.

## 2.2 FluoroMax and FluoroMax-P

For rapid, easy use, the rugged, self-contained FluoroMax fits the bill. The FluoroMax, while retaining unmatched sensitivity, achieves many of the same measurements as the Fluorolog<sup>®</sup>, though its fixed optical design makes its operation simpler to master, even for the least sophisticated user. Options, including scanning remote samples through fiber optics, variable-temperature control, and polarization, make it simple to analyze hazardous wastes, screen drugs for effectiveness, and perform hundreds of other uses. For all these uses, plus the added convenience of a phosphorimeter to determine long-lived luminescence lifetimes, the FluoroMax-P is ready to run.

## 2.3 Fluorolog<sup>®</sup>-Tau

As an extension of the Fluorolog<sup>®</sup>, not only can the Tau lifetime system record steady-state spectra, but it can also determine dynamic fluorescence properties down to the picosecond timescale. Fluorescence dynamics is one of the most powerful tools available to biochemical research. The modular Tau can be configured for just about any researcher's needs, with multiple light sources and detectors that tailor its operation to a given sample or experimental setup. Switching between steady-state and dynamic modes is as easy as the turn of a knob.

## 2.4 FluoroMap — Microscopic Mapping of Fluorescence

For the researcher interested in fluorescence of microscopic as well as macroscopic samples, the FluoroMap does the job. The FluoroMap incorporates the flexibility, modular construction, and dynamic and steady-state recording of the Tau, plus adds a confocal epi-fluorescence microscope with programmable stage, to allow studies on the micron scale of cells and cellular structures, as well as novel materials such as nanoparticles. A digital camera plus custom imaging software lets the user choose which areas of the magnified image to scan for fluorescence. A CCD-array is included for rapid data-collection, along with a photomultiplier tube to give the most sensitive results possible.

## 2.5 SkinSkan — Takes Fluorescence to the Sample

The SkinSkan is the only spectrofluorometer designed specifically for *in-vivo* surface measurements on skin, with extremely low stray-light interference from these highly scattering samples. Small and light enough to be transportable, the SkinSkan goes where the fluorescence is. It can be wheeled into a room to measure the effectiveness of sunscreens, or into an office to measure aging of a patient's skin or hair. The SkinSkan even has taken data on plants in the Brazilian rainforest. Fitted with a fiber optic probe, data can be taken directly from the sample's surface, in any orientation.

---

## 3 | Unmatched Flexibility

The researcher and user of Spex® spectrofluorometers has unmatched flexibility in customizing the instrumentation. Accessories are available for analyzing nearly every kind of sample imaginable: solids, liquids, thin films, cells, and powders, even *in situ*. The researcher can control the sample's temperature with liquid nitrogen, water baths, and the speed of a Peltier heater/cooler. Fluorescence-polarization measurements can be recorded with polarizing filters, to provide extra knowledge about the molecular environment. The science of kinetics — in which chemists learn about speeds of reactions — can be incorporated into the experiments with triggers, automatic titrators to inject precise amounts of chemical reactants into the sample, and stopped-flow accessories to mix and measure samples. Pharmaceuticals can be screened rapidly using the MicroMax plate reader, for up to 384 samples in one plate. The imagination is the only limit with JY's accessories for Spex® instruments.

---

## 4 | Conclusion

Wherever fluorescence research leads, JY's Fluorescence Division is committed to providing the highest performance instruments to make impossible measurements routine. Our mission is to supply our customers with unmatched sensitivity, be it in the lab, the field, or anywhere researchers go.

### Note

Fluorolog® is registered in the U.S.A. Spex® is registered in the U.S.A. and European Union.



**Ray Kaminski**

Jobin Yvon Inc.  
Fluorescence Division  
Director