

## White Paper

# The Science is Skin Deep – How advanced skin analysis is transforming the image of beauty.

With the rise of medical spas and the popularity of anti-aging therapies comes the need to set apart leaders in the professional skin care industry. To offer a competitive advantage for driving treatment and skincare sales for your practice requires the development of a leading skin counseling technique with real-time, objective skin assessment calibrated against dermatological scales.

Advanced skin analysis procedures utilizing non-invasive imaging tools and **Fluorescence Spectroscopy** produce identifying characteristics of the surface and sub-dermal layers of the skin; these features can be quantified and evaluated through artificial intelligence technology.



### The Technology

#### Fluorescence Spectroscopy

The interaction of light within tissue has been used to recognize local biochemical changes since the beginning of medical science. The measurement of tissue absorption, fluorescence and phosphorescence allow the monitoring of changes in electronic energy states, which provide biochemical information for diagnostics. The recent development of small light sources, high resolution detectors and thin film filter technology combined with image processing and partial signature recognition provide opportunities to quantitatively measure these interactions. This process yields information for diagnosis at the biochemical, structural or (patho-)physiological level within intact tissue.

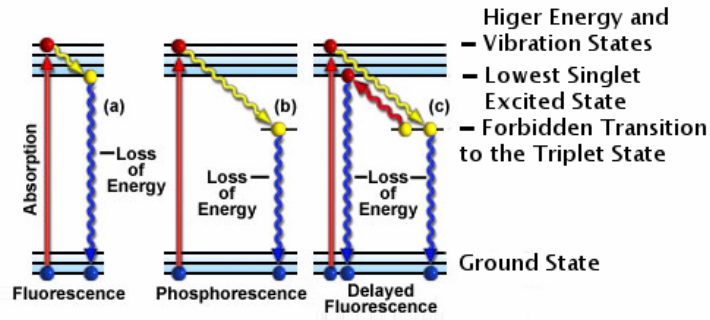
Fluorescence spectroscopy evaluates the physical and chemical properties of tissues by analyzing the intensity and character of light emitted in the form of fluorescence. This technology has been utilized for the non invasive detection and quantification of many skin deep conditions.

#### Optical Interaction

Energy in the form of light photons can activate certain molecules within a cell.

The subsequent radioactive relaxation of the molecule is accompanied by the release of reemission photons in a process termed “fluorescence.” Illustrated in *figure 1*.

Figure 1: Diagram of excitation



The wavelength of the photon causing the activation is termed the “excitation wavelength”; the wavelength of the emitted photon is the emission wavelength. Fluorescence spectroscopy is the detection and analysis of this reemitted optical signal. Molecules that can fluoresce are called “fluorophores.” Many of the endogenous fluorophores in tissue have been identified through clinical research.

### Quantitative Skin Assessment

Using real time Fluorescence Spectroscopy combined with artificial intelligence provides a complete system solution for quantitative skin assessment. Utilizing mathematical algorithms; skin features and conditions are recognized and measured that would otherwise be impossible for a human mind to grasp and extract from an image that is multi dimensional and rich in information.

Clarity™ Pro, Skin Condition Detection & Evaluation System, enables one to measure and quantify skin conditions with computer precision. Developed by BrighTex Bio-Photonics, LLC at the San Jose BioCenter, a Silicon Valley Innovation Center for Biotechnology, in partnership with Moritex USA hardware. This state of the art technology harnesses multi-spectral image capture and image processing power to identify and quantify over 30 different types of skin conditions, such as

- extent and susceptibility of photo damage
- variation in the evenness of skin tone due to melasma, rosacea, hyperpigmentation
- excessive sebum production
- bacteriostatic pores, altered pH level creating a breeding ground for *p. acnes*
- inflammation, irritation of the follicle due to a combination of excess sebum and porphyrins (*p. acnes*)
- deep inflammation, pores highly susceptible to pimple/abscess formation
- chronologic aging – wrinkle measure & evaluation of collagen cross-links