Ultraviolet Induced Fluorescence Digital Photography as a diagnostic tool for discovery, digital documentation, analysis and curation of paleontological specimens

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The use of ultraviolet light to stimulate fluorescence in fossils, referred to as Ultraviolet Induced Fluorescence (UVIF), is well known, but has not been widely used by paleontologists.

Our poster presents compelling examples of its many benefits.

WHAT DOES UVIF DIGITAL PHOTOGRAPHY PROVIDE?

It provides the ability to detect soft tissue preservation and fine structures of teeth and bones which are invisible in normal light.

- Simple to use, cost effective and can be used by anyone.
- Provides immediate photographic images.
- It can be used as a diagnostic research tool.

It also helps to identify repairs, restoration or embellishment.

HOW IS UVIF DIGITAL PHOTOGRAPHY PERFORMED?

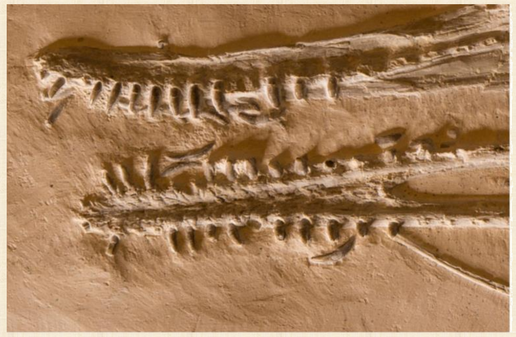
- **Ultraviolet lights** are directed onto a fossil, to **stimulate fluorescent minerals**.
- The energy is released as **visible light**.
- **Digital cameras** can use **long exposures**.
- **Results** are available **immediately.**

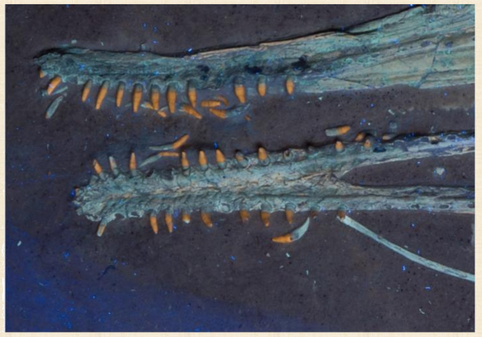
EQUIPMENT

- Standard digital or mirrorless camera.
- High-performance lamp, 95-watt UV A, B and C bulbs.
- Tripod or camera stand.
- Optional: Motorized lift table; 4K monitor.

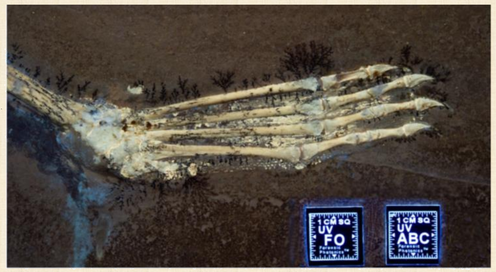
Recommended: Linear Polarizing and Orange Color Filters, scale bar, color card, 1cm tiles and cube.

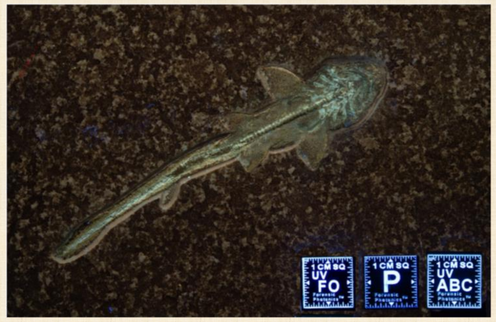
Required: UV Safety goggles, protective clothing/suntan lotion.





LF2809 Pterosaur. Visible Light vs. UVABC + filters. These two images demonstrate the increased clarity and definition of teeth and jaw structures that can be obtained with the use of **UVIF.**

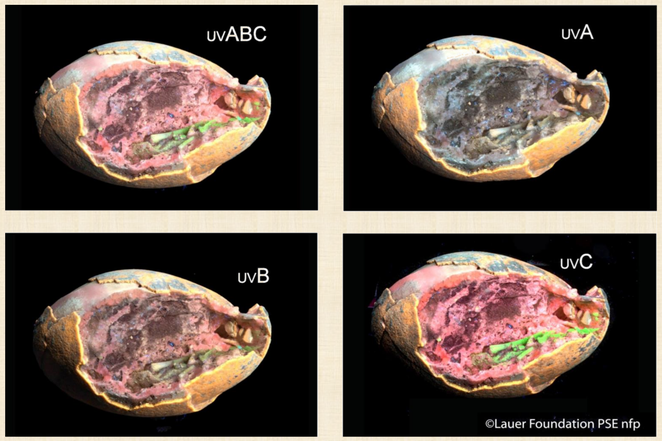




Visible vs. UVIF Reveals Soft Tissue Preservation:

LF2314 *Pterodactylus* leg and foot. UVIF revealed skin and the webbing of the foot.

LF1657N Juvenile Shark. UVIF images of this tiny fish revealed clearly defined gills, dermal denticles and increased resolution of positive/negative elements of the vertebrae.



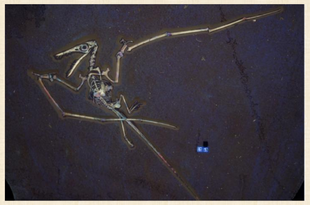
LF3139 Bird egg with exposed embryo

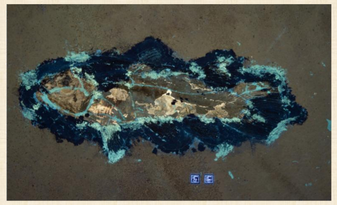
This specimen demonstrates why we document **UVABC** wavelength responses together and individually.

The UVABC showed an impressive fluorescent response; **UVA** had no internal fluorescence; **UVB** had a minimal response but **UVC** alone showed the strongest response.

LF2437 *Aeger* Shrimp

We use filters to increase clarity and definition, to reduce glare and excessive purple from the UV lights. The final image was achieved by using **UVABC** + linear polarizing and orange filters.





Finally, UVIF images reveal detailed skeletal anatomy as well as repairs, artistic restorations and embellishments.

LF1182 *Rhamphorhynchus* demonstrates good preparation and bone detail, which facilitates accurate measurement and analysis.

LF283 The sad coelacanth shows why it is important to know how and to what extent fossil "restoration" has been made.

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