IGUANODON 2.0

Shepherding the 'Belle-Epoque' Bernissart Iguanodon collection into the 21st Century

Contract - B2/202/P2/Iguanodon 2.0

SUMMARY

Context

Discovered in 1878 in a Belgian coal mine, the Bernissart Iguanodons, represent one of the most iconic palaeontological finds in history. Over 25 complete and articulated skeletons of *Iguanodon* were unearthed, offering the first full view of dinosaur anatomy. These fossils, housed at the Royal Belgian Institute of Natural Sciences (RBINS), are central to both scientific research and public exhibition. However, due to their fragile condition—mainly caused by pyrite degradation—there is an urgent need for advanced conservation and documentation techniques.

Objectives

The Iguanodon 2.0 project aimed to:

1. Digitally document the entire Bernissart collection using high-resolution 3D scanning.
2. Analyze past restoration techniques and their impact.
3. Assess the current physical and chemical integrity of the fossils.
4. Develop a preventive and curative conservation protocol.
5. Enhance scientific and public access to the collection through digital platforms.

Results

1. Digitization and 3D Modeling

- Over 2,000 bones were scanned, resulting in 4 TB of data.
- A complete digital atlas of *Iguanodon bernissartensis* is being created.
- The data enabled studies on intraspecific variation, pathologies, and skin impressions.

2. Paleohistology and Geochemistry

Non-invasive techniques (CT, μCT, μXRF, LIBS, FTIR, AFM-IR) revealed:

- The presence and localisation of 30 mineral phases, including pyrite.
- Insights into diagenetic processes and restoration materials.
- Isotopic data suggesting *Iguanodon bernissartensis* was non-migratory, living in a restricted area with well-marked seasonality.

3. **Mechanical Integrity**

- Finite Element Analysis (FEA) showed the iconic thumb spike could withstand up to 5000 N, supporting its use as a defensive or social tool.

Conclusions

The Iguanodon 2.0 project:

- Set a new benchmark for fossil conservation.
- Digitally preserved a national scientific treasure.
- Enabled new research avenues in palaeobiology and taphonomy.
- Provided interactive public access to the collection via web platforms and museum installations.

It aligns with RBINS’s strategic goals for 2020–2025, enhancing the heritage value, conservation, and accessibility of its collections.

Keywords

Bernissart Iguanodons, conservation, scientific heritage, 3D digitization, geochemichal analyses, valorisation.