

Seeing Clearly - Turning Microscopy Data into Discovery at Texas A&M University

Ovation Data combines life science expertise and a custom workflow to deliver a tailored solution to the challenges of computational analysis of microscopy data.

➤ Background

Modern electron microscopes generate extraordinary insights supporting the development of new diagnostics and treatments. But they also create vast unstructured datasets that are difficult to manage and computationally heavy, resulting in slow analysis.

A single microscopy experiment can generate terabytes of raw and processed images. Tracking these files, running multiple AI tools, and storing outputs securely is technically demanding and often **beyond the capacity of most university IT systems**. The alternative, outsourcing to external suppliers, is too expensive for most research groups.

Without flexible systems that can grow with demand, researchers rely on multiple external expensive hard drives and inconsistent file formats, making valuable information difficult to find and/or reuse. Time that could be better spent on discovery is instead lost to basic data administration.

At Texas A&M University's Microscopy and Imaging Center, Dr Anindito Sen wanted a smarter way to handle this complexity. A consultant to Ovation Data, he knew the team had the experience and expertise to create a solution that would make the data easier to organize and process without adding extra pressure on researchers.



**Reduced
Workflow from
48 Hours to
68 Minutes**

> Key Challenges

Extremely large data volumes need intensive processing.

Managing hardware and workflows is time-consuming and needs specialist coding knowledge.

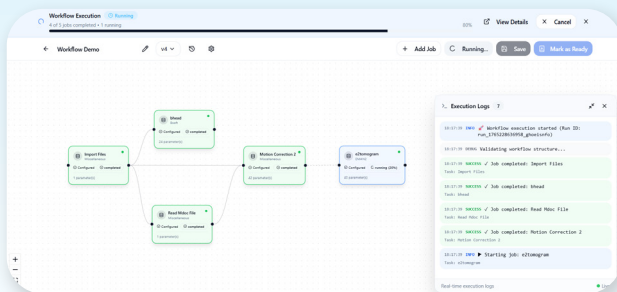
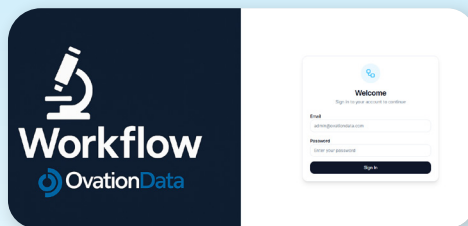
Limited access to graphics processing units (GPU) and AI resources.

No capacity to expand storage for growing datasets.

> Solution

Ovation Data and Dr. Sen developed an integrated workflow that combines data ingestion, processing, and access through Ovation's **Workflow software** and **private AI environment**. The solution brings together simple, mobile-enabled user interfaces, GPU and computer processing unit (CPU) resources, and secure short- and long-term storage, without researchers needing any coding knowledge.

Researchers can review outputs from multiple sources in real time and can run, monitor, restart and delete workflows remotely. Results can be summarized and shared with anyone who has access. Simultaneously, the system assesses data quality as it's collected, helping researchers avoid wasting time and resources on unusable samples so they can move on to the next experiment sooner.



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> Results



Significant time savings

Time to save and run complex image processes reduced from 48 hours to 68 minutes.



Smart data ingestion

Files are automatically organized and meta-tagged for easy retrieval.



QC and AI processing “on-the-fly”

Users can launch tools such as Bsoft, EMAN2, CryoSPARC and/or other important software packages from any device, in any order, as often as needed.



Secure data storage and sharing

Both raw and processed data are preserved with audit trails and role-based access.



Improved access and collaboration

Remote, secure access allows researchers to initiate or observe processing from wherever they are located.

> Conclusion

Combining Dr Sen’s practical experience from the Microscopy and Imaging Center with Ovation’s data-handling tools, the team developed a workflow that brings order, speed, and accessibility to complex microscopy datasets.

Researchers now spend less time on manual data handling and more time on the work that matters, interpreting and analyzing data. Having data stored consistently and processed through the same workflow also makes it easier for teams to collaborate across labs and disciplines.

“For groups working under tight budgets and time pressures, a clearer, more reliable way of handling their data helps them move from experiment to insight more smoothly.”

Dr. Anindito Sen, Ph.D.

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