

Documenting Microscopy Experiments Using ChatGPT and Labfolder

I've had a lifelong interest in science and earned a PhD in chemistry over 30 years ago. More recently, I've found new inspiration in microscopy and macro photography. This exploration has been deeply rewarding, combining the precision of science with the creativity of visual art.

A major challenge for me has been keeping my work well-documented. I have dysgraphia, a learning disability similar to dyslexia but affecting writing instead of reading. This struggle with documentation has been a tremendous obstacle throughout my career, making it hard to keep consistent scientific records and, at times, limiting my progress. Recently, I started using ChatGPT alongside Labfolder, creating a digital workflow that finally allows me to keep thorough, reliable records—and focus more on the science itself.

Using ChatGPT for Documentation

At the microscope, I keep the ChatGPT chat function open, allowing me to talk directly to it as I work. While it can sometimes be a bit interruptive, ChatGPT's feedback settings let me control the level of response, keeping my focus on detailed observations. This setup has enabled me to capture my real-time descriptions clearly, keeping a consistent and thorough record of each step in my process.

A key part of this workflow is how ChatGPT helps me keep track of the images I capture. At the start of each session, I log the initial file number as a reference point for the series. Each time I take a new image, I give ChatGPT a description, noting specific structures or formations and their details, which keeps a precise, organized record of each file number and image.

This conversational approach with ChatGPT also helps when I'm observing microbes, copepods, and other organisms in pond water samples. While ChatGPT isn't particularly useful for identifying these specimens from descriptions or images, it does guide me in describing them more thoroughly. ChatGPT's prompts encourage me to capture specific details—like the structures, movements, and unique features of each organism—that I might otherwise overlook. This level of detail is invaluable for building a complete documentation record, even if the identification of each organism requires other resources, like forums and reference books, where I can compare my findings with established descriptions.

At the end of each session, I ask ChatGPT to summarize everything into a structured lab notebook entry. It consolidates my observations, image descriptions, and file references into a detailed, cohesive summary. This final lab notebook entry allows me to have a clear, comprehensive account of the session, ready to review or reference later. This process has made a remarkable difference in the clarity, reliability, and organization of my documentation.

Using Labfolder as a Digital Notebook

Labfolder is an Electronic Lab Notebook (ELN) that provides a digital solution for organizing and recording my experiments. In my Labfolder setup, I've created a variety of project folders to keep my microscopy and photography work organized. My microscopy projects include moss samples from my backyard, pond samples from Speedwell Lake, a microbe aquarium, and various crystal imaging studies using polarized and other illumination types. This project structure makes it easy to revisit any experiment, add new observations, or build upon past findings.

Each experiment begins with a new notebook entry in Labfolder under the relevant

project. For example, in a recent Tylenol cross-polarization crystallization experiment, I created an entry under my crystal imaging project. In this experiment, I prepared slides with Tylenol dissolved in different solvents to observe how crystallization patterns varied under cross-polarized light. Solvents included acetone, ethanol, and isopropyl alcohol, with some slides heated and others kept at room temperature, allowing me to examine the impact of these conditions on crystal formation.

During the experiment, I used ChatGPT to document each step, from initial preparation to observations at the microscope. After capturing each image, I noted the file number and provided a brief description of its content, creating a well-organized, descriptive image log. ChatGPT's assistance ensured that each detail was captured accurately, without needing to juggle handwritten notes or rely on memory.

Once the experiment was finished, I asked ChatGPT to generate a summary specifically tailored for my lab notebook. This detailed overview included observations, file numbers, descriptions, and conditions for each sample, creating a comprehensive record of the experiment. I then transferred this summary to Labfolder, attaching the corresponding images directly to the entry. This allowed me to keep each visual with its specific details and context, making it easy to revisit the Tylenol experiment in the future with all the information in one place.

Current Limitations and Future Potential

The one disadvantage of this system, which is yet to be resolved, is the lack of a direct integration between ChatGPT and Labfolder. Currently, I have to copy and paste the summarized content from ChatGPT into Labfolder. Labforward, however, has recently expanded its focus on AI capabilities and merged with LabTwin, a

company specializing in voice and AI-driven lab assistants. This merger indicates a commitment to enhancing Labfolder's digital capabilities and could eventually lead to a direct integration with AI tools like ChatGPT.

In the meantime, Labfolder's expansion into AI brings promising potential, and I am hopeful that they will introduce features that could further streamline my workflow, allowing for even more seamless documentation.

A New Era of Documentation

The integration of ChatGPT and Labfolder has truly transformed my approach to documenting microscopy experiments. ChatGPT provides an interactive, real-time platform for capturing observations, organizing image records, and creating detailed summaries, while Labfolder offers a structured digital space to store and manage everything. Together, they have made my documentation more accurate, accessible, and complete, enabling me to focus more on the scientific exploration itself.

Oh, and ChatGPT helped write this article.

Gedaliah Wolosh, comments welcomed email – gwolosh AT gmail DOT com.

Editor's note – the author shares striking image galleries on his website

www.woloshnet.com

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