PULSE

Postdoc Upskilling in Laboratory & Specialized Expertise

A Professional Development Initiative for Postdoctoral Scholars at UNC Core Facilities

Title of Proposed Project

Optimization of virtual reality image analysis tools

Name of Core Facility

Microscopy Services Laboratory

Core Director Name (*Official contact for the program)*

Pablo Ariel, pablo_ariel@med.unc.edu

Project Description

The Microscopy Services Laboratory (MSL) supports image analysis for researchers at UNC. Among the tools we offer is the virtual reality analysis software SyGlass. This tool has been underutilized, because of lack of awareness among researchers and lack of workflows for easy interoperability with our other main software for analysis of 3D images, Imaris. This project will directly address these limitations in several ways.

First, the postdoc will explore the advantages and disadvantages of different data formats in SyGlass, evaluating speed and convenience of conversion, data size, speed of opening, interoperability with Imaris, quality and responsiveness in SyGlass. If needed, they will generate tools to streamline data conversion using the Syglass Python API, Jupyter notebooks and/or self-contained executables.

Second, the postdoc will work to increase the interoperability between Imaris and Syglass. Both programs can create objects to annotate data, which are called spots, surfaces, and filaments, in Imaris. We want researchers to be able to create those objects in one software, and then visualize, display, refine and analyze them in the other software, over multiple iterations. This may require using the Syglass Python API, and additional custom Python tools. If necessary, these should be wrapped in user-friendly environment running Jupyter notebooks, or as standalone executables.

Deliverables for these first two goals will be:

- Written SOPs detailing various workflows.

- Training videos based on screen recordings various workflows.
- Software tools, when applicable.

Third, the postdoc will, with assistance from the director of MSL, organize a one-day workshop for the software, with company representatives on-site, and an opportunity for researchers to demo the software at MSL. Part of the organization will be a targeted outreach campaign to labs and researchers that would specifically benefit from analyzing their 3D datasets using virtual reality tools.

Finally, the postdoc will take the lead in training new users in the use of SyGlass after the workshop.

A candidate for this position will have a basic understanding of Imaris and have experience visualizing 3D data, as well as some basic experience using Jupyter notebooks. An ideal candidate will have experience with data analysis in Imaris, some experience with SyGlass, and experience writing Python code and/or creating Jupyter notebooks. This opportunity will allow the postdoc to become an expert in Syglass, and its connections to other tools. The increased efficiency and knowledge in operation of this software will directly benefit any relevant research projects in their own labs. They will also gain experience organizing a workshop and training new users in this image analysis tool.

The Director of MSL will provide initial training in SyGlass and Imaris, as needed. They will provide constant support and feedback as tools are developed. The Director will provide assistance in organizing the workshop. If any trainings are scheduled, the Director will provide guidance on developing an initial teaching plan, and observe and provide direct feedback on teaching strategies.

Expected Skill Development

Experience with the SyGlass virtual reality analysis software. Experience with the full version of the Imaris analysis software. Experience making Python tools user-friendly. Experience organizing a workshop. Experience training and teaching researchers to use software tools.

Scheduling Considerations

Scheduling can be flexible and can take place in anything from 2 hour blocks every day, to one full day a week, at the postdoc's convenience. Two limitations are that a significant portion of this will need to be in-person, at MSL (as it will involve a VR headset) and that at least 1 hour a week will be an in-person meeting with the Director of MSL. The earlier this project can begin, the better.

Estimated Time Commitment

6 hours/week

Expected Project Duration

12 weeks

Designated Mentor(s)

Pablo Ariel, Director of MSL. I expect at least one hour of interaction, in-person, per week, plus some emails to exchange information. This is an absolute minimum and I expect a close working relationship with a lot of interaction as problems are identified and surmounted.

How often will the mentor meet with the participating postdoctoral scholar?

As needed / flexible

Required Background or Skills

Basic experience with data visualization in Imaris. Basic experience using Jupyter notebooks. Preferred: experience with data analysis in Imaris, experience with SyGlass, experience creating Jupyter notebooks and/or writing Python code.

Onboarding Plan

Onboarding will consist of an introduction to the core location, procedures for using the MSL workstation, and the iLab calendaring system. I expect this process to take 1 hour.

Training Plan

If needed, there will be training in Imaris and Syglass. For Imaris, I will provide initial training in visualization, creation of videos, and creation of surfaces. This will take around 4-6 hours. There will be subsequent, basic training in creating spots objects and filaments which will take another 4-6 hours. For Syglass, initial training on visualization will take 3 hours. Subsequent training on creating objects will take another 3-5 hours. All of this training will take place at the MSL image analysis workstation and will be conducted by the MSL director. These in-person trainings will be preceded by study of training videos that are already available from MSL, as well as the companies that created SyGlass and Imaris.

Potential Deliverables/Outcomes

Method development
Training or outreach materials
Skill Development