Scientific Repertoire

The goal of this document is to transparently showcase my skills in *science communication*, *research methodologies*, and *field work*. I will also elaborate on *future learning goals*. It is not a CV or resume. Contains a colorized proficiency rating system and links to the indicated item.

Underlined words are links to referred section or website/software.

Proficiency Rating System

◎ Knows about it. Used/done once or twice.

◎ Amateur: Used/done a few times. Confident but needs more work.

◎ Proficient: Easily done with minimum error. There is always more to learn.

Statement of Interests

Field protistology
Exploration, characterization, and interpretation of microbial eukaryotic diversity.
Model organism development
Isolating, culturing, and characterizing novel protist lineages.

There is a significant gap between the actual number of described protist species and the total number of protist species on Earth. Most exploratory research in this area relies on broad systematic sampling of protist diversity highlighting novel species. However, this method only reveals novel specie existence, and it does not characterize their morphology. It is inherently difficult to identify, isolate, and culture free-living heterotrophic cells. Enhancing the discovery process could provide novel model organisms for multiple fields and has potential for interdisciplinary application outside of biology. What is major here is that I am currently doing independent research like what I want to do in graduate school. **[Website]**.

Co-interests: Science communication and teaching. Organismal photography and microscopy. Husbandry. Field research and specimen hunting.
Biological subdisciplines: Comparative biology. Eukaryotic microbiology. Field protistology. Molecular biology and biochemistry. Paleontology. Biogeography. Biophysics (mainly of light and fundamental particles).
General interdisciplinary study: Physics of matter. Electricity and magnetism. Microscopy and optics. Biochemistry. Photography and videography. Model organism biology.

Science Communication

◎ Teaching: Three years of tutoring biology, chemistry, and physics classes. I use tutoring opportunities to practice new ways of teaching complex scientific ideas. In addition, I've been a teaching assistant for three years. Mentored students in science, research methods, and graduate school.

◎ Presentation: In both poster and oral formats. Aversion to jargon and strong emphasis on background and significance. Expressing results in a transparent way, highlighting both positive and negative parts. Led many journal clubs talking about exciting research from many fields within Biology.

◎ Life Photography/videography: Seeing life in action proves fruitful in education. Item exhibition photography. Various forms of photomicrography. Video editing in Davinci Resolve Studio.

◎ Writing/Literature: *I could greatly improve my scientific writing*. I have yet to write a scientific paper. I have written several abstracts/proposals/research descriptions.

Research Methods and Techniques

Research via Computer

◎ Probing the frontiers of science and literature. Finding relevant information to the project.

◎ Referencing software: Mendeley, Zotero, Papers App.

◎ Protocol finding and development. Essentially, I can cook well because I adapt the recipe.

⌘ Biotechnology
- ◎ NCBI resources: BLAST, GenBank, Conserved Domain Search.
- ◎ NEB cloning tools
- ◎ UCSC Genome Browser and VirtualBox
- ◎ Benchling, SnapGene
- ◎ I-TASSER

⌘ Coding
- ◎ html and css
- ◎ R for biology. Currently using packages for metabarcoding and phylogenetics.

⌘ Comparative Biology and Databases
- ◎ GBIF, ITIS, EoL, WoRMS, OBIS
- ◎ Lifemap (ncbi version)
- ◎ GPlates, PaleoBioDB

In the lab

⌘ Husbandry and Model Organisms – Keeping life in the lab.
- ▪ Vertebrate Animals
  - ◎ Pig models: Some exposure to using pigs in research.
- ▪ Invertebrate Animals
  - ◎ Amphioxus/Lancelets: Used them as models of ancient chordates.
  - ◎ Flatworms: *Planaria*
  - ◎ Nematodes – wild and lab strains.
  - ◎ *Turbo fluctuosa* (Marine snail)
  - ◎ Antlions
- ▪ Protists
  - ◎ Algae: *Nannochloropsis*, *Tetraselmis* (Marine)
  - ◎ *Pyrocystis* (with reversed circadian rhythms)
  - ◎ Ciliates: *Paramecium, Blepharisma, Spirostomum*
- ▪ Plants (Currently no lab plants) – Future directions entail a green house.
- ▪ Bacteria
  - ◎ *E. coli* – For food and cloning.

⌘ Molecular
  ◎ Cloning and DNA work: PCR, ligation, restriction digests, DNA purification, DNA Precipitation, RNA isolation, cDNA Synthesis, electrophoresis (and making gels), plasmid mini and midi preps, transformation, and bacteria culturing.
  ◎ Tissue culture: (293T, RAW 264), and transfection (mammalian).
  ◎ Protein work: Western blotting; dot blot; ELISA

⌘ Microscopy & Imaging
  ◎ Inverted, light, dissection scopes.
  ◎ Fluorescent Microscopy
  ◎ Confocal Microscopy: Leica SP8 w/LasX.
  ◎ **Software:** AxioVision (for Zeiss cameras). ImageJ. Image Pro. MyoVision. Helicon focus.
  ◎ Adept at photoshop and making images look presentable or publishable

⌘ Histology
  ◎ Immunohistochemistry: *In muscle tissue* – Cryosectioning, staining, confocal microscopy.
  ◎ Fungal staining

⌘ Organic Chemistry
  ◎ Chromatography – Paper and column
  ◎ NMR and data interpretation
  ◎ IR Spectroscopy
  ◎ Some synthesis and isolation techniques

⌘ Chemical Use and Handling
  ◎ Experienced in organizing, disposing, and handling chemicals. Especially if they are from the 70s.

Field Research

◎ *Lacking in mentored field research experience.*

◎ Identification, collection, husbandry, and visualization of certain organisms [go to: Husbandry].

⌘ Marine environments
  ▪ Currently conducting research in the Gulf of Mexico for the search of peanut worms. Hopes to isolate Holozoan protists.
  ▪ Licensed in advanced open water diving. Experienced in boating.
⌘ Rivers
  ▪ Metabarcoding and isolation techniques in Texan rivers. Holozoan protists.

Goals for Learning and Future Experience

Writing and literature

- ⌘ Funding: How to write grants and proposals.
- ⌘ Publishing: How to write and put together research articles and reviews.
- ⌘ Clarity: Make writing readable and avoid jargon as much as possible.
- ⌘ Data: Easily understandable graphical designW

Biological subdisciplines

- ⌘ Ecology, oceanography
- ⌘ Marine microbiology
- ⌘ Nutrient cycling

Field research

- ⌘ Interested in field protistology, little experience.

Instrumentation

- ⌘ Interference and electron microscopy.
- ⌘ Mass spectrometry.
- ⌘ Computed tomography.

Programing

- ⌘ Interested in learning R and python for data visualization.
- ⌘ How to process and visualize data.