1. **Career goals**

Using computer (mainly R) to:

1. Investigate the evolutionary relationships among species through phylogenetic analyses
2. Investigate the distribution patterns of species and understand the historical factors that have shaped contemporary biogeographical patterns
3. Integrating molecular phylogenetics with spatial analyses to explore the role of geological and ecological events in shaping the spatial diversity of organisms
4. Investigate the role of environmental factors, including climate and ecological interactions, in driving evolutionary processes and shaping the diversity of life
5. Create R package and codes to carry out above for myself and future researchers

Academia goals

* 1. Post-doc fellowship in academia in countries where I can conduct above
  2. Teaching and researching in academia

1. **Potential PhD Chapters**

1. Evolution of Carnivorous Plant Traps

2. Carnivorous Plant Biogeography

3. Carnivorous Plant Diversification (speciation/ extinction linked to traits/ regions)

4. Carnivorous Plant Genomics?

5. Carnivorous Plant Distribution Model?

1. **PYR writeup topics**
2. Publishing the paper: Evolution of Carnivorous Plant Traps (the project we did in honours year, I will run the code again, review papers and publish)
   1. Learn GitHub and construct a well-documented archive for the data and code on the carnivorous plant trap evolution paper
3. Provide, to Nick, worked-out examples of key techniques to be used in the thesis, with illustrations generated by R code, covering key techniques to be used, with short written explanations:
   1. Likelihood, log-likelihood, Maximum likelihood, likelihood ratio test, and AIC/AICc/BIC and statistical model comparison with the same, Markov models for discrete characters, SSE models, biogeography models, comparison of log-likelihood and RSS (residual sum of squares) in linear regression, explanation of linear regression as an ML technique
   2. Phylogeny objects in R, and how to manipulate them
   3. Perform basic bioinformatics tasks in R and command line terminal (relabelling sequences in FASTA files, generating alignments, trimming alignments, etc…)
   4. Use of Iqtree and Beast2 on a basic sequence dataset
   5. Explanation and use of different kinds of graphs: scatter plots, histograms, bar charts, box plots, violin plots, PCA or NMMDS plots (R introductory workshop on Oct/2024?)
4. Assembly of a geography dataset for carnivorous plant biogeography
5. Full thesis proposal by 1st June 2025:
   1. Title
   2. Abstract
   3. Background and Rationale
   4. Research Aims and Objectives
   5. Research Design and Methodology
   6. Timetable?
   7. Bibliography?
6. **Trainings/ Meetings. Ranking by importance**

**Meetings:**

1. SBS Research and Teaching Showcase (2 mins intro + one slide) on Dec/2024?
2. NZ phylogenomics (Kaikoura 2025, 11th Feb 10 am -14th Feb 12 pm 2025)
3. Evoldir at Marseille (aeeb.fr) in 2025

**Trainings:**

1. Key R techniques, Beast 2, Iqtrees, and GitHub use
2. Communication: More confidence when talking people, and be able to give explanations/ rebut objections
   1. Regularly attend PhyloBioGeo (paper discussion + give some talks) + Alexei’s meeting
   2. Local + International meetings
3. Networking (through meetings)