What is a research proposal?

• **Statement of intent**
  
  ─ Academically prepared to complete the research
  ─ **Audience:** peers, supervisors, examiners
What is a research proposal?

• A research proposal is your PLAN
  – It describes in detail your study
  – Decisions about your study are based on the quality of the proposal

• Approvals to proceed by the Institutional Review Board
Importance of a research proposal?

Contract between you and your committee

1. Serves to protect the student
   - Demanding additional requirements

2. Protects the committee from the student
   - From delivering a degree of poor quality
What are the essential ingredients?

The Issue
What problem does your research address?

Research Design
How will the research achieve its objective?

Benefit
What will the research contribute?

Figure adapted from MIT OCW
Research proposals make you:

- **OUTLINE** steps in your proposed research
- **Provide yourself with intellectual CONTEXT**
- **JUSTIFY** your research
- **Be CREATIVE**
- **THINK** through your experiments
- **Anticipate potential PROBLEMS**
- **Anticipate a realistic TIMETABLE**

Figure adapted from MIT OCW
Getting started

- Title
- Outline
- Literature Review
- Methodology
- Methods of data collection and analysis
- Ethical Issues
- Timeline
- Resources
- Outcomes
- Reference list

- Title
- Background
- Problem statement
- Aim and objectives
- Rationale and context
- Methodology
- Plan of work
- Resources / Support
- Outcomes
- Reference list

Know the requirements BEFORE you start
GPS address

- Mini-abstract
- Clear
- Concise
- Subject 1st
Problem statement

• Short SO WHAT statement

• Purpose
  – Blueprint for your literature review
  – Focus your committee at the beginning
  – Keep them on track throughout your proposal
Problem statement

• E.g.
  Malaria remains the most devastating infectious disease, particularly in Africa. One reason is that the parasite causing the disease is resistant to all clinically useful antimalarial drugs. We therefore have to devise alternative strategies to target the parasite.
Literature review

This is NOT just a summary of literature

Show how your project:

- Literature SUPPORTS your hypothesis
- EXTENDS previous work
- AVOIDS previous mistakes
- IS UNIQUE to previously followed paths
The narrative of a good literature review

Reader knows

Reader doesn't know
The narrative of a good literature review

Introduce the field:

- Malaria
- Epidemiology

broad focus
The narrative of a good literature review

Focus on certain aspects in field of interest
The narrative of a good literature review

End with gap analysis
Purpose

• Funnel point is your purpose:
  – The purpose can be framed as a research question or hypothesis
  – BE CONCISE
    • One sentence!!!
    • Solution to your problem
Support the hypothesis

Malaria Epidemiology

Life cycle
Current control

Resistance

Hypothesis
Make a list of references

Malaria
Epidemiology

Life cycle
Current control

Resistance
Internet/Referencing

• Narrow down your search terms
• Peer-reviewed articles
• Current literature
• Review vs primary literature
Despite substantial scientific progress over the past two decades, malaria remains a major global health burden and is required to overcome increasing resistance against artemisinin-based treatments. To address these challenges, a comprehensive understanding of the stages of malaria infection and target malaria species that transiently remain dormant in the liver is essential. In this review, we discuss the latest developments in malaria medicines, grouped by the various target compound or product profiles, to assess progress and future directions.
Plagiarism

• Reference immediately after mentioning
  – Not end of paragraph

• ALWAYS identify source

• Summarise useful points
Purpose

• Funnel point is your purpose:
  – The purpose can be framed as a research question or hypothesis
  – BE CONCISE
    • One sentence!!!

• Leads directly into Aims and Objectives
Aims and Objectives

The purpose of this research is to......

• Aims
  - short but general statement of intent

• Objectives
  - very specific statements that define the practical steps you will take to achieve your aim(s)
Methodology

• Section used to JUDGE the validity of results and conclusions

• This section of your proposal has multiple parts
  – Instrumentation and infrastructure
  – Study groups and ethics
  – Access to samples
  – Data analysis

• Justify your method choice
• Show you understand the principles
• Prove feasibility of your study
Experimental design

In vitro cultivation: 
*P. falciparum* 3D7, W2

Full IC$_{50}$ determination on asexual parasites

Induction: gametocytogenesis

*In vitro* assessment of inhibition of viability of gametocytes

Identify lead analogues

Cytotoxicity determination

Assessment C and N metabolism

Phenotype microarrays
Timeline

• Helps you keep your experimental design in the correct order
• Avoids “dead” time
• When building your timeline
  – Consult with other students in your lab that have done similar studies
Budget

• Give you an appreciation of research costs
• Prevents you from overspending!
• Provide specific explanations for:
  – Need for specific technologies
  – Need for other financial requests (e.g. conference, instrumentation, staff, bursaries etc).
  – Do you really need this kit?
Outcomes

• What do you expect the results to be?
• Measurable
  – E.g. you will get a degree
  – New patent / paper
• Qualitative
  – Contribute understanding to subject / new technology / application
Revise and Edit

- Back-up proposal everyday!
- Always print on paper and edit
- Use standard font
- Number your pages
- Read out loud
Common pitfalls to avoid

• Forget to include table of contents
• Not connecting the proposed research to the literature review
• Not enough detail about methods
• Jargon & sweeping generalities
• Relying solely on your supervisor
Improving Your Odds

• Know what the evaluation criteria will be and CHECK that you meet these
• Start with an outline
• Read approved proposals
• Once “finished” ask others to proofread
• Use diagrams to illustrate models
• Make sure your mentor approves it before you submit
Evaluation of proposals

– The aims/objectives are likely to be achievable in the given time period
– The rationale for the proposed study is reasonable
– The scientific design is described and adequately justified
Any Questions?
Presenting your proposal

Material from: Stephanie Pfirman and Susan McConnell (Stanford)
Purpose of a proposal presentation?

• Persuading evaluators to support your research project

• Make your proposal compelling
  - Convince audience that project is worth doing
  - Convince audience that you are capable of carrying it out
Preparing for the research presentation

• Structuring your story
  – Summarise the content
• Preparing and giving the presentation
• Concluding your presentation
• Questions and answers
Structure

• Basic rule
  – Say what you are going to say
    • 1-3 main points in the introduction
  – Say it
    • Give the talk
  – Then say what you said
    • Summarise main points in the conclusion
  – Don’t try to build suspense and then unveil a surprise ending
Stick to the Script

• Prepare your material so that it tells a story logically
  – Introduction/overview
  – Research question
  – Aim and objectives
  – Method/approach
  – Expected outcomes/summary

• Prioritise the content

• Create continuity so that your slides flow smoothly
  
  Your last point on one slide should anticipate the next slide
Know your Audience

• Assume that your audience comprises of
  - experts in your topic
  - intelligent generalists with exposure to your field

• What do you want the audience to learn?
  – Think about this as you construct your talk
  – Edit your slides -- delete what is unnecessary, distracting, confusing, off point
Questions to ask yourselves about slide design

• Is everything on the slide readable?

• Do the slides have a good balance of text and figures?

• Is there something I can illustrate?
Questions to ask yourselves about slide design

• Have I chosen clear, specific titles that express the main point of each slide?

• Is the design/format of my slides consistent?

• Do I have slide numbers?
What Size Font to Use

Type size should be 30 points or larger:

18 point

20 point

24 point

28 point

36 point

AVOID USING ALL CAPITAL LETTERS BECAUSE IT’S MUCH HARDER TO READ

* References can be in 12-14 point font
What font to use

Use a Sans Serif vs Serif font:

Sans Serif

Serif font
What font to use

Use a Sans Serif font:

This font is Arial.
This font is Calibri.
This font is Comic Sans.
This font is Papyrus.
This font is Lucida Console.

Fonts set the tone...

Use bold to make text clearer:

This font is Times New Roman.
This font is Courier.
This font is Didot
This font is Didot

This font is Ravie

Arial vs. Arial bold
Calibri vs. Calibri bold
Many experts feel that a dark blue or black background works best for talks in a large room.
Powerpoint basics: Color

Dark letters against a light background are best for **smaller rooms**, especially when the lights are on for teaching
Avoid red-green combinations 8-10% of the human population is red-green colorblind.

Lots of people can’t read this – and even if they can, it makes your eyes hurt.
Powerpoint basics: Color

Other color combinations can be equally bad:
Powerpoint basics: Color

View your slides in grayscale to ensure that there is adequate color contrast in each slide.

Other color combinations can be equally bad!
Multitarget antimalarial polyamine analogues: resisting resistance?

B Verlinden and L Birkholtz

Centre for Sustainable Malaria Control
University of Pretoria
South Africa
• Use 3-4 bullets per page
  - Key words

• Limit text blocks to no more than two lines each.

The reason for limiting text blocks to two lines is that when the text block goes on and on forever, people in the audience are going to have to make a huge effort to read the text, which will preclude them from paying attention to what you are saying. Every time you lose their focus, your presentation suffers!
Layout

• Try your best to include a simple image on every slide.

• Limit the number of items on each slide.

• Each slide should make just one or two points!
If you try to cram too much into a slide, and place things too close to the sides, they can get cut off if you’re using a poor projector. In any case, the slide looks all cluttered and junky.
Animations

• Useful tools if you want to guide your audience through multiple points / facts

• Introducing lists
  with each fact
  requiring an explanation
  that you will provide orally

• Use sparingly and don’t automate
MDCK cells form a lumen following a change in extracellular [Ca++]
MDCK cells form a lumen following a change in extracellular $[\text{Ca}^{++}]$
Lumen formation is blocked in EMK1 knockdown cells
Animations: alternative

- Sometimes, animations get corrupted when opening your presentation on a different computer:
  - PC – Mac differences
  - Powerpoint version differences
  - File sizes and image sizes

- Rather copy a figure and add new information each time
Preparing Your Data

• Figures
  – ‘1 figure ≈ 1000 words’
  – Figures should be readable, understandable, uncluttered
  – Keep figures simple, use color logically for clarification
    • Blue = cold, red = warm, dark = little, bright = a lot
    • Invisible color
  – Explain axes and variables
  – Include reference on figure
Figures..

- You can use web sources for figures
  - Include reference
Preparing Yourself...

• Reread your written proposal
  - Familiarise yourself with content

• Divide your presentation into chunks (5 slides)

• Don’t over-practice your first draft
Preparing Yourself...

- Mock present to your mentor/ supervisor
  - Practice Q and A session

- Practice makes.....

- Practice using a voice recorder/ video camera and timer
Preparing Yourself...

• Practice in front of your friends/family
• Practice your introduction and conclusion extensively
• Visit venue beforehand (visualize)
  - Preview presentation
Preparing Yourself...

• Make sure you are familiar with the projection equipment, slide changer and Powerpoint

• Bring your laptop with and your USB

• Arrive at the venue early
What to Wear ...

• Dress up – maybe wear a jacket?
  – Wear nothing distracting

  – From “Ask Dr. Marty” AnimalLabNews (Jan-Feb 2007)
  – Dark clothes are more powerful than light clothes
  – Shirts or blouses with collars are better than collarless ones
  – Clothes with pressed creases (!) are signs of power
Number one rule

#2 Rule

be enthusiastic
Giving the Presentation

• Don’t apologize or make comments about yourself
  – “I hope you’re not bored”
  – “I was working on this ‘til 3 am”

• Stand where the figures can be seen

• Engage with presentation
Giving the Presentation

• Don’t overuse the pointer

• Don’t worry about stopping to think
  – Use your notes

• Don’t rush
  – Figure out which slide is your half-way mark and use that to check your time

http://www.dvd-photo-slideshow.com/screenshot/01.gif
Giving a good talk

• It’s a mental thing

• Project your voice
  - Vary your tone

• Talk to your audience, not to your slides.

• Don’t pace up and down but also don’t stand rigid
Running Out of Time

• Avoid this –if it happens ...
  – Do not skip all of your slides looking for the right one to put on next

  – Type slide number and hit enter

  – Conclude – on time wherever you are in your talk -- by making your main points
Concluding Your Content

• Announce the ending so that people are prepared

• Come back to the big picture
  – Summarize the significance

• Open up new perspective
  – Describe future work, raise questions, potential implications

Finishing Your Presentation

• Think carefully about your final words and how to finish your presentation
  – Don’t just drift off … “I guess that’s all I have to say …”

• End strong
  – Say “Thank You” … pause for applause … then
  – Say: “Any questions?”
  – Don’t forget acknowledgements, always give proper credit
Minor Interruptions During Your Presentation

• Don’t look irritated or rushed

• A question that you will answer later in your talk?
  – Say “Good point; just wait two slides”

• Requires a long answer and is not critical understanding?
  – Say “Good point; I’ll come back to it at the end of the talk.”
Questions and Answers

- Usually you have thought more about the material than anyone else

- Anticipate typical questions and prepare for them

- Still concerned about questions?
  - Make extra slides – perhaps on details of instrumentation or methodology

http://www.regislasvegas.org/images/class-pic-hand-raised.jpg
Questions and Answers

• Questions definitely help you in writing up your research
  – Identifies parts the audience did not understand

• Can you repeat the question?
  – Also if you heard the question incorrectly, it presents an opportunity for clarification

• If you don’t know the answer?
Questions and Answers

• Keep your answers short and to the point
  – don’t respond with another lecture

• Don’t say that a question is bad, or that you addressed it already

• If the questioner disagrees with you
  – Defuse the situation
Difficult Questions, continued

• If you really don't know the answer
  – Say "Interesting, I will look into that" or “That’s a good point, let’s discuss it afterwards”

• If the questioner disagrees with you and it looks like there will be an argument then defuse the situation
  – "We clearly don't agree on this point, let's go on to other questions and you and I can talk about this later"
Resources

• http://www.cgd.ucar.edu/cms/agu/scientific_talk.html

• Micheal Alley:
  – Craft of scientific presentations
Any Questions?