
# Mapping out your (rehabilitation) grant

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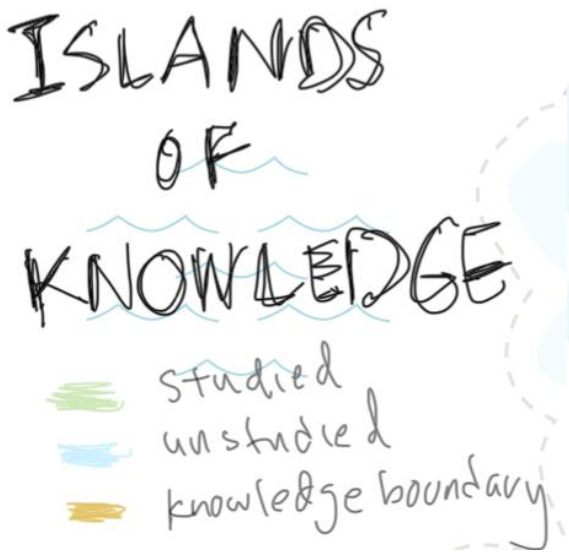



Clinical

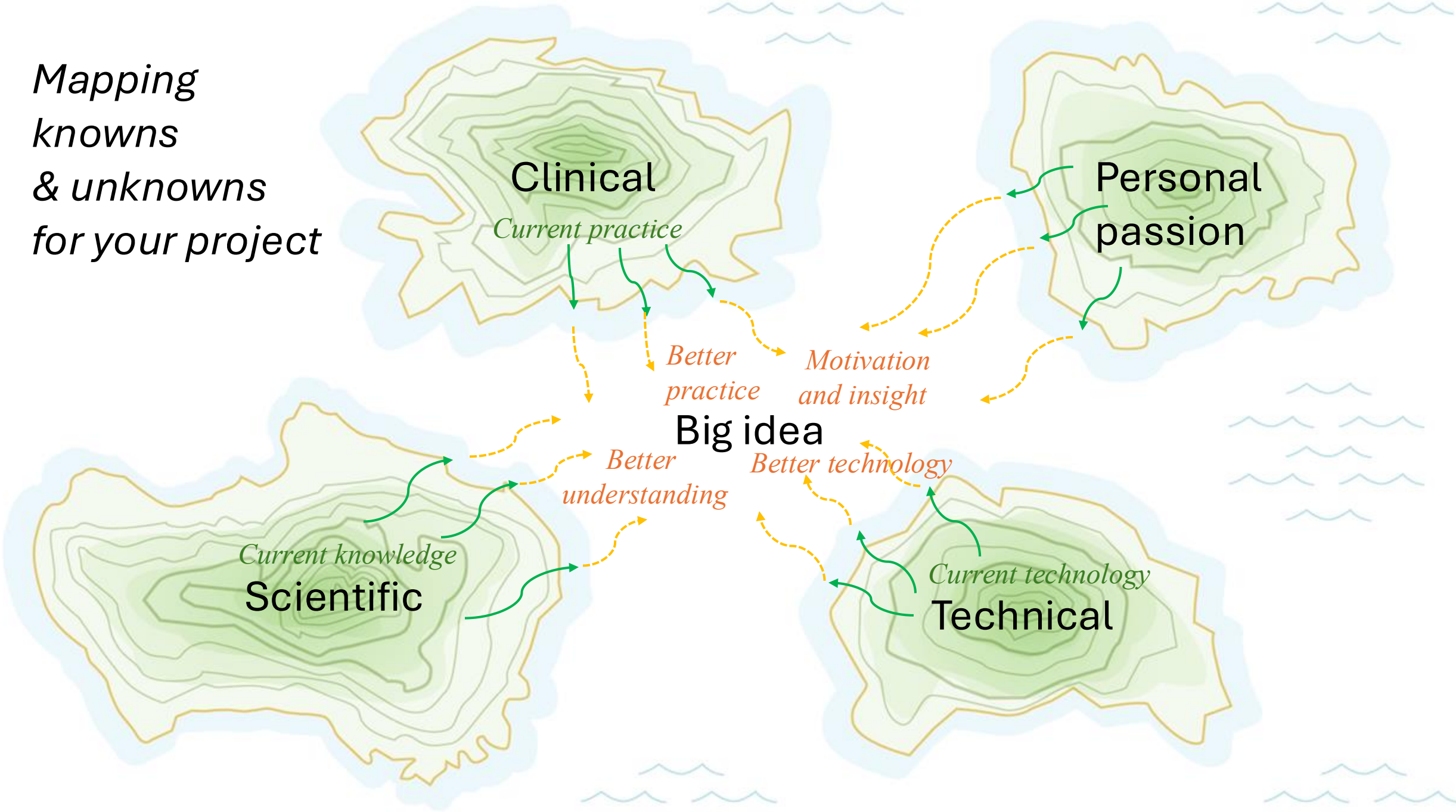
Personal passion

Big idea

Scientific

Technical

*Mapping knowns & unknowns for your project*



# Laying the groundwork for future success

- Use the NIH Plan for Rehabilitation Research: *Moving the field forward*

- Rather than repeating the early success and later failures of clinical trials, aim at barriers to success of prior clinical trials
  - Lack of appropriate technology
  - Lack of precise clinical metrics
  - Lack of basic science understanding


# C: TECHNOLOGY USE AND DEVELOPMENT

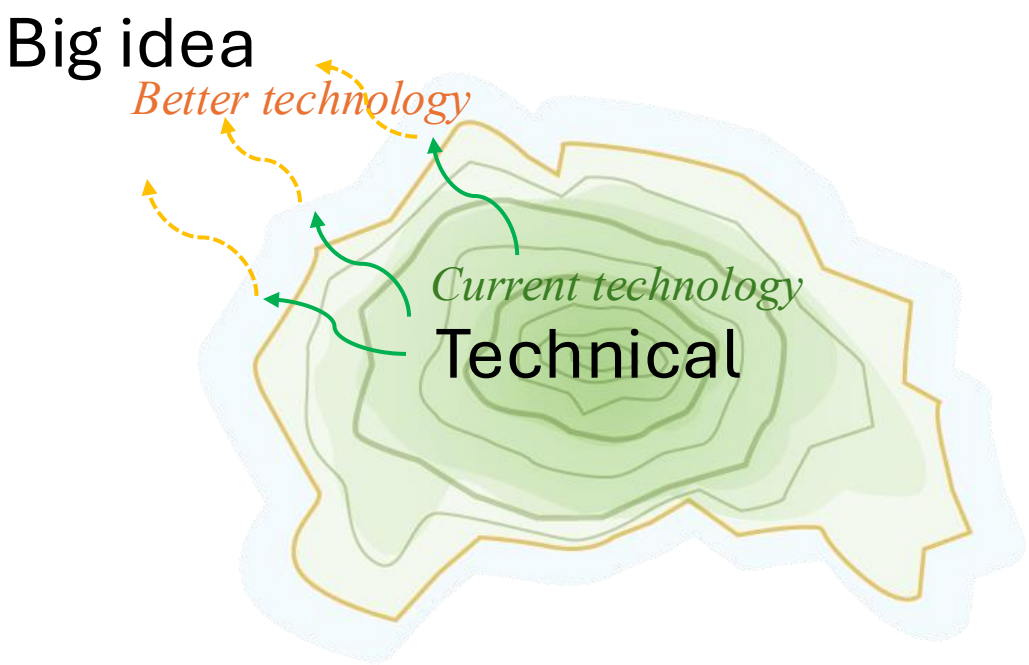
***Objectives***

1. Advance the use of telehealth in rehabilitation assessment, delivery, and adherence monitoring.
2. Advance the use of assistive technologies (AT), noninvasive sensors, and mobile health (mHealth) approaches in rehabilitation science.
3. Provide an evidence base for device development, manufacturing, and implementation for individuals with disabilities, including methods to incorporate needs and preferences of users.
4. Support research to better define new and innovative metrics and outcomes of interest in the use of various technologies in rehabilitation.
5. Encourage the use of computational models for designing and developing new rehabilitation technologies and for evaluating their functional outcomes.
6. Support technology development that incorporates monitoring and remote access in the acquisition, analysis, and monitoring of data from individuals who are receiving care or continued support in their homes.

# Write a 2-page pilot grant proposal in the area of rehabilitation technology

- Typical Grant Sections
  - PROBLEM
  - BACKGROUND
  - SPECIFIC AIMS
  - INNOVATION
  - APPROACH
  - (IMPACT)

Where are these sections on the map?

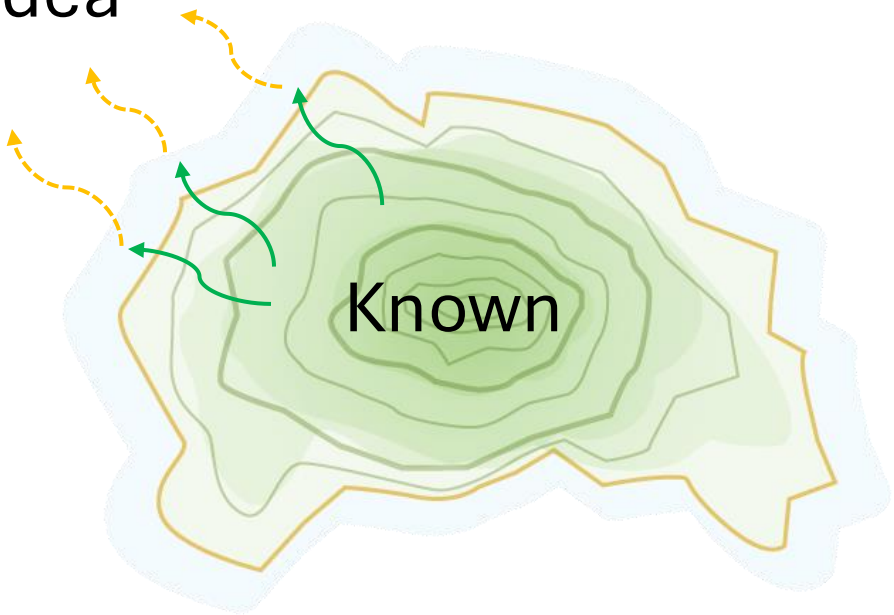


# PROBLEM

A well-motivated and potentially impactful idea that addresses a scientific, technical, and/or clinical gap

- What is the need and/or gap?
- Who will it help?

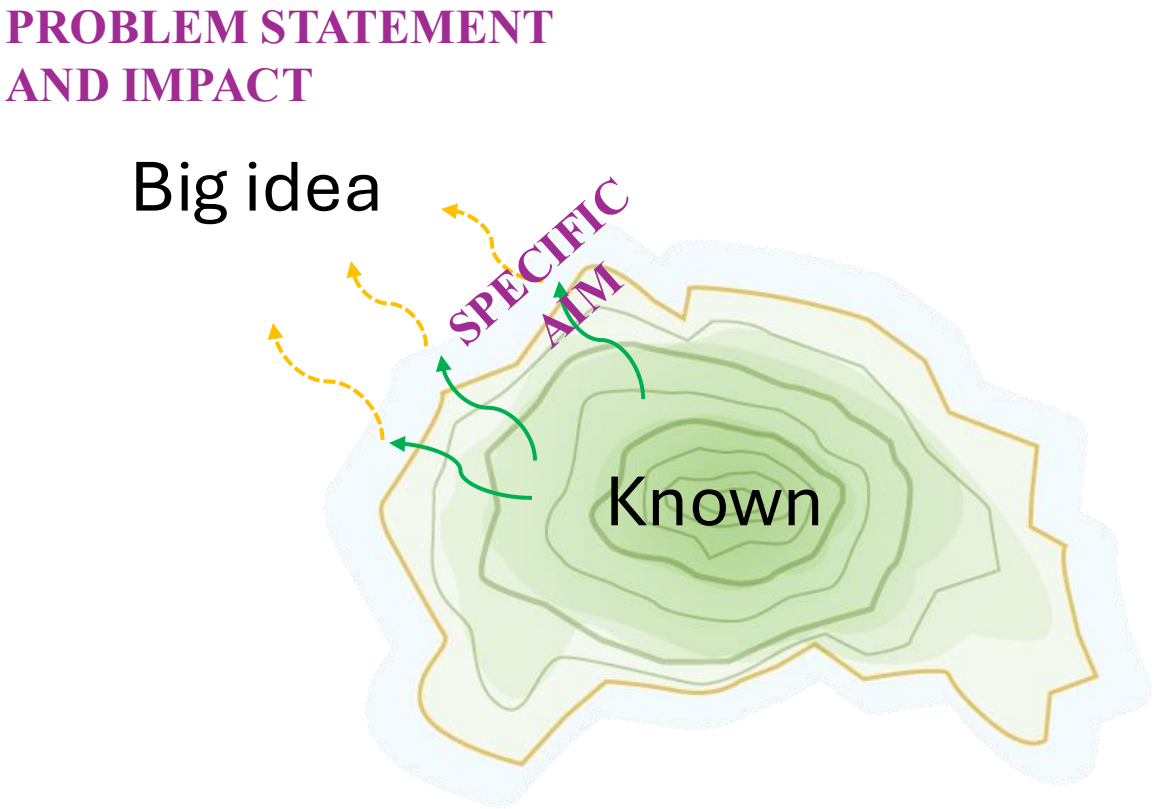
**PROBLEM STATEMENT AND IMPACT**



# SPECIFIC AIMS

## Specific aims focus work at knowledge boundaries toward the big idea

- Turn long-term goals into small, feasible, impactful steps
- Deliverables that are specific to your work
- Aimed at barriers toward your big idea
- Can be parallel streams of work, i.e. scientific, clinical, technical
- Can serial streams of work, i.e. design, build, test
- Extends what is known



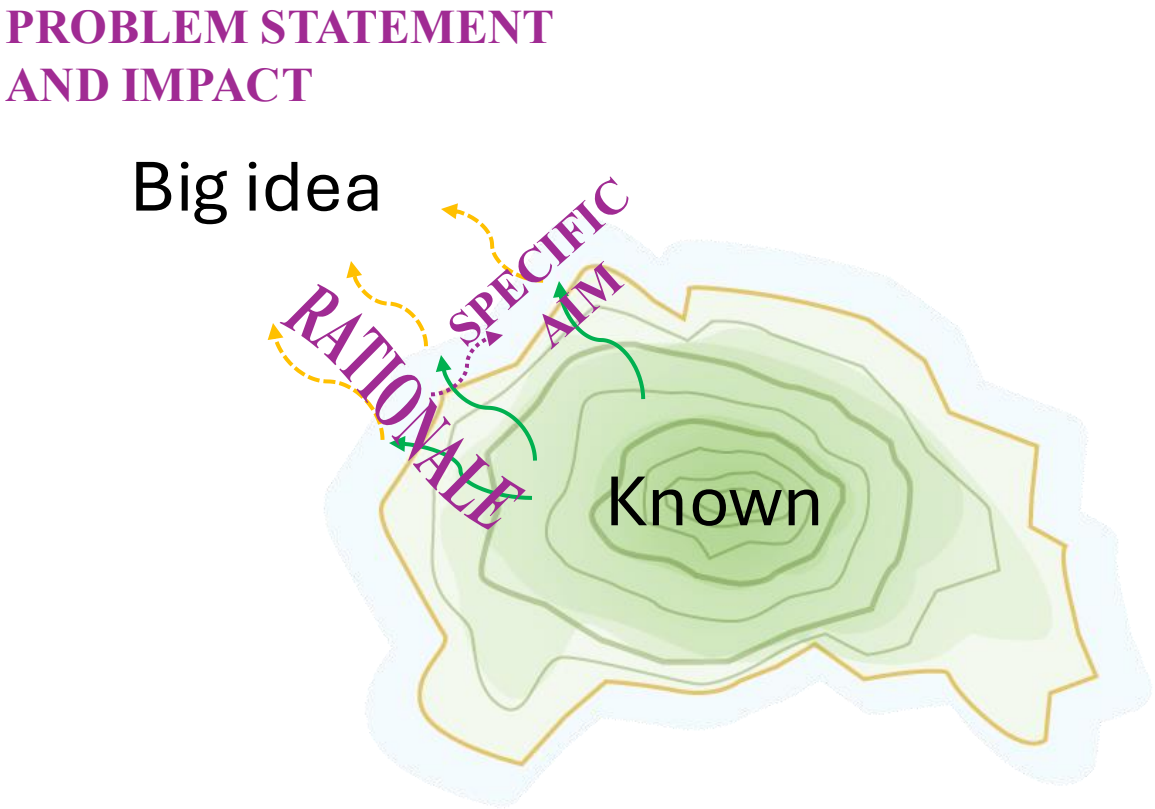
# What are specific aims?

- A coherent set of ways to achieve a *common objective*
- Independent ways to test a *central hypothesis*.
- Your intellectual deliverables and how you will do it.
- Statements that focus on *why*, and then *what*.
- Statements that also inform me of your basic methodologies
- Statements with verbs such as Identify, characterize, determine…

# BACKGROUND →RATIONALE

A clear rationale to an infinitely ignorant but infinitely intelligent reviewer, leading them to come up with your aims as they read

- There is no such thing as “background”, only rationale
- Also known as “significance”
- Lead your reviewer along your specific the path between the known to the unknown
- Inform them of barrier that keeps you from your big idea that is directly motivates your aims (foreshadowing)
- Provide a rationale for each major element of the grant
- “We lack X to enable Y”



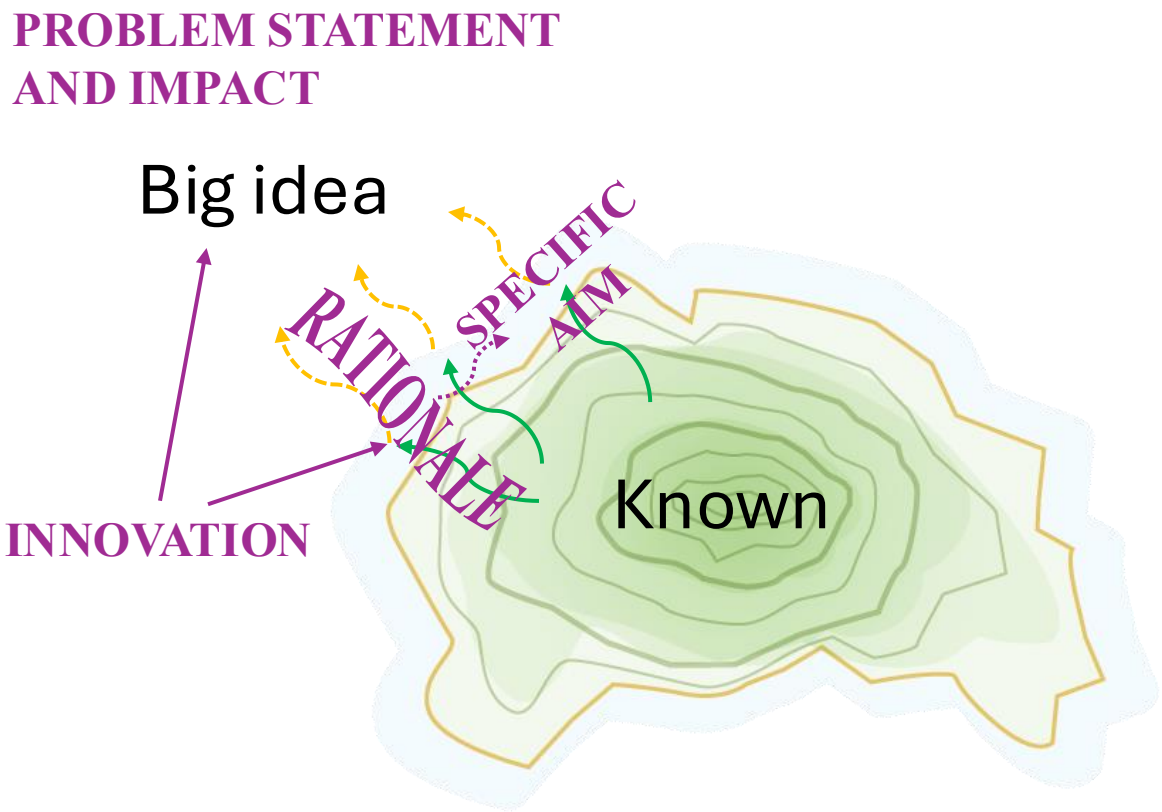
# There is no such thing as “background”

- This section is about the significance of your proposal, and not general background for your population/disease/questions.
- Each paragraph must provide rationale for your work.
  - Be explicit about why you are presenting information. Don’t make your reader need to infer the point.
  - Think about it more like tutoring or teaching
- Lead the reviewer to come up with the research you have proposed.
  - Make the review feel smart – like you are on the same wavelength.
  - Don’t be afraid of repetition:
    - There is a need to bridge gap X to enhance Y. My proposal will bridge gap X using technique Z.
- Determine your specific aims and work backwards

# INNOVATION

## Differentiate your aims/approach/idea from the current state of the art

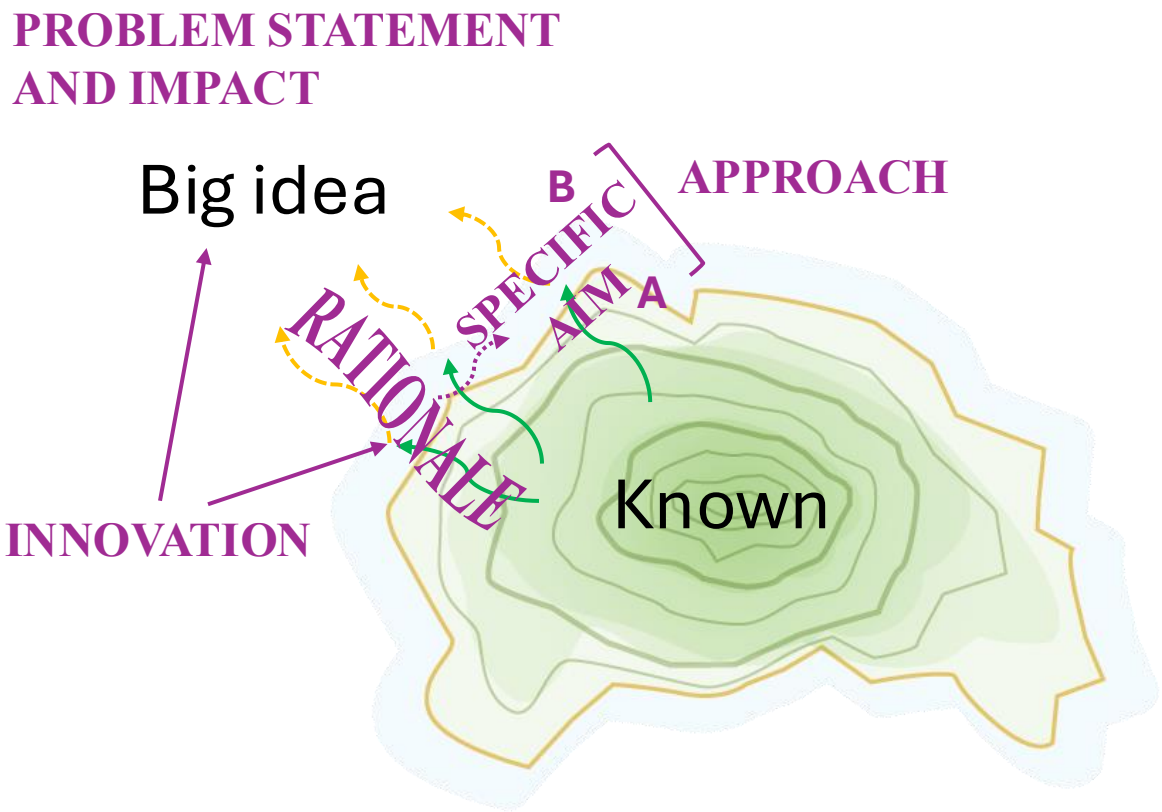
- A short statement that identifies how this isn't business as usual.
- "X is innovative because Y"
- Don't rehash what the current knowns are, this should already be done in rationale



# APPROACH

## Identify protocols and measurable outcomes to chart progress

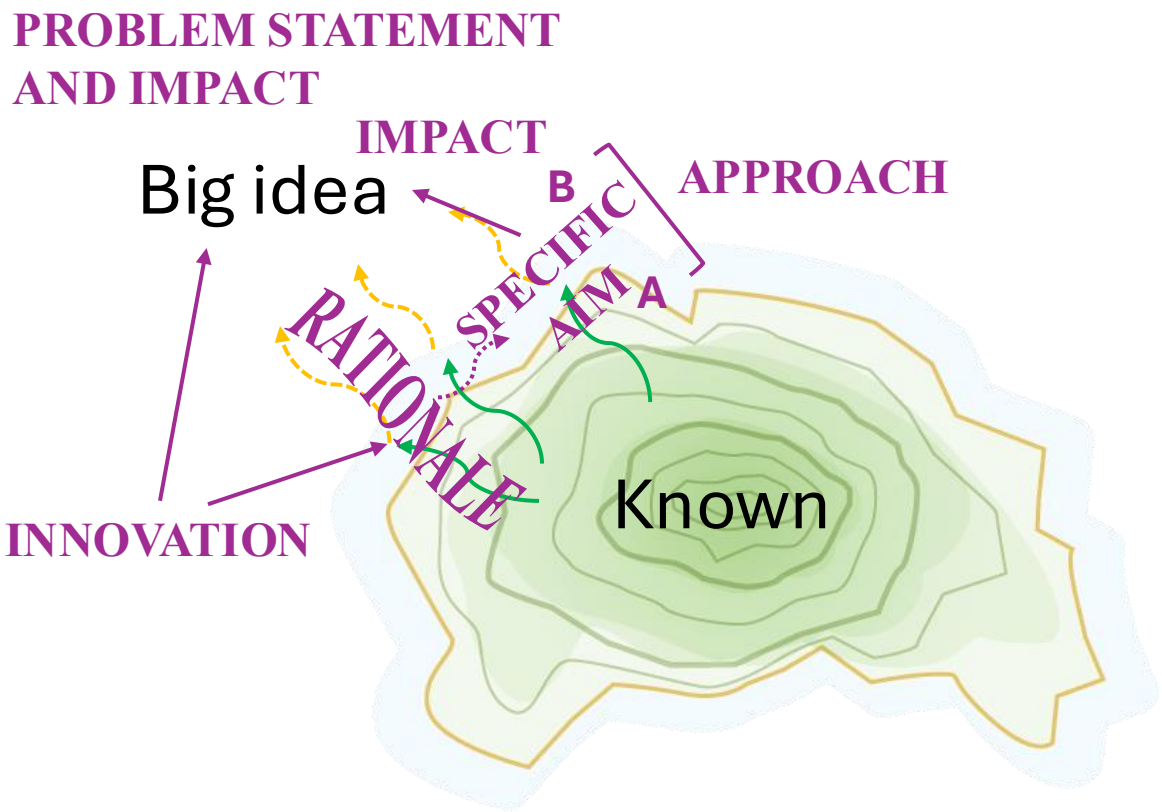
- Explain how you will expand the island of the known, i.e. get from point A to B
- What are the procedures that you need to take to accomplish your specific aims?
- What measurable outcomes will let you know that you are successful?



# IMPACT

## Explain how your work is the first step along an exciting path

- What will this small step enable you and others to do in the future if you are successful?
- Why is this proposal worthy of funding?
- Leave the reviewer with the idea that you are planning more that what you have proposed



# *Beyond Clinical Trials:* Making an impact

- Turn long-term goals into small, feasible, impactful steps
- Make specific aims specific to your work.
- If successful, how will you work help advance the field?
- What will your stakeholders gain: scientists, clinicians, patients?

# Effective grant writing is about :

- PROBLEM: A well-motivated and potentially impactful idea that addresses a scientific, technical, and/or clinical gap
- RATIONALE: A clear rationale to an infinitely ignorant but infinitely intelligent reviewer, leading them to independently come up with your aims as they read
- SPECIFIC AIMS: Focused work at knowledge boundaries toward the big idea
- INNOVATION: Differentiating your aims/approach/idea from the current state of the art
- APPROACH: Protocols and measurable outcomes to chart progress
- IMPACT: How your work is the first step along an exciting path

# Scientific writing advice for engineers

- Your job here is to make a clear, convincing, logical, argument.
  - This is not a creative writing assignment. Forget what your learned in English class
- Construct your text like a proof, or a piece of code.
  - Decide the main points you would like to convey and them in the first sentence of each paragraph.
  - The rest of the paragraph should only provide evidence to support that statement.
- Tell a story about you. Use the present tense and be exciting.

# Laying out your grant

*Key ideas expressed in a single sentence*

- PROBLEM → **Gap and Significance**
  - A needed scientific, technical, and/or clinical gap
  - The importance of filling this gap
- BACKGROUND: **Rationale**
  - Rationale/Need for why you need to do X
  - Rationale/Need for why you need to do Y
  - Rationale/Need for why you need to do Z
- SPECIFIC AIMS **What I will deliver**
  - Aim 1: uses X to do Y
  - Aim 2: uses X to do Z
- INNOVATION
  - Explain the novelty of the approach
- APPROACH
  - What you will do to test/measure/validate X
  - What you will do to test/measure/validate Y
  - What you will do to test/measure/validate Z
- IMPACT
  - What could the future look like if you are successful?

*Check if these statements would help a reviewer write a bullet point review of your grant*

# Each sentences should be used at the beginning of each grant paragraph

- **The first sentence of each paragraph should provide a coherent, self-standing sentence that answers each of these questions.**
- Do not start the paragraphs with statement of general fact that are not connected to actions your will specifically take in the proposal.
- Generate the thesis statements first (i.e. the statements from the prior page)
- You can make a general factual statement and begin your argument in the 2nd sentence
- Each sentence in the paragraph should support the first sentence
- **Read only the first sentences of your paragraphs and see if they make a complete and logical outline of the motivation for your grant.** These first sentences are guideposts for the reviewer and also help them skim over the proposal at the time they have to present it during study section. Make sure these are great soundbites to help them remember and write about your proposal.

# A picture can shape a thousand words…

- Create a figure to illustrate your aims
- A good figure allows a reader to “get it” without reading
- The figure will guide and constrain the structure of the aims and grant
- Your text should be aimed at explaining your specific aims and studies

*Map out the knowns and gaps for your grant*

Clinical known :_____

Clinical gap :_____

Personal passion/expertise:

_____

Big idea:_____

Scientific known :_____

Scientific gap :_____

Technical known :_____

Technical gap :_____

# More unsolicited (mostly writing) advice

neuromechanicslab.emory.edu