**Differential diagnosis for problems in grants (Aims & Research Strategies)**

1. Is it a scientific problem or a presentation problem?
2. If it’s a presentation problem, what kind of problem is it?
   1. If the argument seems weak or doesn’t advance, the writing might display one or more of the following pitfalls
      1. Fluffy – lots of words not working; you notice a lot of prepositional phrases
      2. Circular – at the sentence and paragraph level
      3. Repetitive – at a section by section level
      4. “Splat” – concepts and sentences are not connected; is a Gopen term
      5. Tells rather than shows – conclusions are stated without any examples or evidence that enable a reader to evaluate the conclusion and agree or disagree.
      6. Word choices create uncertainty in reader – different terms used for same concept, excessive “couching” or timidity, undefined terms
      7. Critical content isn’t in the right place at the right time – critical content might not be stated explicitly, formatting may obscure it, etc.
      8. Cut & paste residuals – previous language has been used without sufficient tailoring, resulting in one or more of the following: missing connections, competing narratives, unexpected asides, etc.
   2. If, as a reader, you think “I can’t even” with this, the writing might exhibit or create one or more of the following pitfalls
      1. Author comes across as arrogant or uninformed – word choices are bolder than warranted by the scientific method or appear to demonstrate naiveté about the field or research in general
      2. Problem as described comes across as insurmountable – overly firm or dramatic statements of gaps or failures of previous efforts, or lack of any previous effort, without a fairly immediate discussion of why now is the right time and this the right team (i.e., Heilmeier questions <https://www.darpa.mil/work-with-us/heilmeier-catechism>)
      3. Researcher or team comes across as wannabes rather than the right group to solve the problem – not enough is said about the team’s unique qualifications or prelim data early enough
      4. Overly flowery – overuse of adverbs and adjectives, routine use of uncommon words
      5. Overly technical – uses jargon without providing ways for non-experts to understand and/or in a way unsuitable for the nature of the funding opportunity and/or review group (also reflects inaccurate/incomplete understanding of the audience)
      6. [If the reader’s frustration is that they don’t ever seem to get anywhere, then weak argument problems (above) may also exist.]
   3. If, as a reader, it seems “off-kilter” or imbalanced as you read, the writing may have one or more of the following pitfalls
      1. “Real estate” problem – missing content or over-emphasized content given nature of project and reviewers; should have equal space for equal weight
      2. Misleading arguments or surprises – early arguments lead the reader to scientific expectations that aren’t met; arguments need to foreshadow all proposed work, remove any red herrings
      3. Formatting/presentation at odds with intended message – “asides” are given too much space or emphasis via formatting; bolding/underlining may draw attention to problems rather than solutions
      4. Logic gaps – a stated conclusion is a leap away from presented facts; fundamental resources are not described in sufficient detail to demonstrate feasibility or unique ability to achieve what others have not
   4. Some/All of the above, then the writing may have the traits of
      1. A “stinky onion” – each read reveals another fundamental problem, and hence a new “layer” of problems to correct that may make you want to cry.
      2. Inaccurate/incomplete understanding of the audience
3. If it’s a scientific problem, what kind of problem is it?
   1. Lack of preliminary data to demonstrate feasibility (if they possess it, it’s a presentation problem, if not, it’s scientific)
   2. Lack of collaborators with required track records or expertise (if they have it, it’s a presentation problem, if not, it’s scientific)
   3. Lack of capital-S “Significance” (feeling from text is ho-hum/so-what; could be a wording/presentation problem, or might reflect an actual uninteresting question)
   4. Aims are not achievable regardless of results (could be a wording problem, but would be seen as a scientific problem in review)
   5. Hypotheses are not testable, or not testable by the proposed methods/aims (could be a wording problem, but would be seen as a scientific problem in review)
   6. Lack of an appropriate statistical analysis section
   7. Proposed/Described experimental approaches do not seem sufficiently rigorous (i.e., only in 2D cell culture, or with outdated models like commercial human cell lines, or no mention of replications, or with insufficiently described consideration of alternatives/justification of one’s choice(s), etc.) (could be a wording problem, but would be seen as a scientific problem in review)
   8. Scope is too ambitious (in terms of time, effort, and/or money, and/or in terms of how many people have been trying to accomplish this goal for what period of time unsuccessfully)
   9. Scope is too narrow (in terms of time, effort, and/or money, or in terms of impact – even if it’s successful, it doesn’t seem like any important progress will have been made)