ME 328: Medical Robotics
Winter 2019

Lecture 9:
Project Discussion

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proposal specifications

- Cover Page w/proposal title and team member names
- 1 page of Specific Aims
- up to 6 pages of Research Strategy, with the following three sections:
  A. Significance (less than one page)
  B. Innovation (less than one page)
  C. Approach (includes preliminary data)
- References

Significance section

includes motivation and background

- Explain the importance of the problem or critical barrier to progress in the field that the proposed project addresses.
- Explain how the proposed project will improve scientific knowledge, technical capability, and/or clinical practice in one or more broad fields.
- Describe how the concepts, methods, technologies, treatments, services, or preventative interventions that drive this field will be changed if the proposed aims are achieved.

from the NIH SF424 Application Guide
http://grants.nih.gov/grants/funding/424/SF424_RR_Guide_General_Adobe_VerB.pdf

Innovation section

includes technical background

- Explain how the application challenges and seeks to shift current research or clinical practice paradigms.
- Describe any novel theoretical concepts, approaches or methodologies, instrumentation or interventions to be developed or used, and any advantage over existing methodologies, instrumentation, or interventions.
- Explain any refinements, improvements, or new applications of theoretical concepts, approaches or methodologies, instrumentation, or interventions.

from the NIH SF424 Application Guide
http://grants.nih.gov/grants/funding/424/SF424_RR_Guide_General_Adobe_VerB.pdf

Approach section

includes preliminary data
(and references if needed)

- Describe the overall strategy, methodology, and analyses to be used to accomplish the specific aims... Include how the data will be collected, analyzed, and interpreted...
- Discuss potential problems, alternative strategies, and benchmarks for success anticipated to achieve the aims.
- If the project is in the early stages of development, describe any strategy to establish feasibility, and address the management of any high risk aspects of the proposed work.

from the NIH SF424 Application Guide
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Approach section structure

- Preliminary studies (about 1 page)
- Aim 1 (usually at least 1 page)
- Aim 2 (usually at least 1 page)
- ... and any other aims ...
  For each aim, describe the specific plan of action and expected outcomes. Use subsections within each aim to describe sub-objectives. Use figures to illustrate your approach.

Optional (at end):

- Timeline
- Summary of milestones to be achieved and how they will enable future work

why peer review?

NIH: wants to ensure a fair and rigorous process so that the best science is supported by the US government

Reviewers: "giving back", learning about new developments, prestige, opportunity to use expertise to make an impact on the direction of the field

In this class: learning more about medical robotics, improve the proposals (yours and the one you are reviewing)

proposal reviews: what NIH does

- Experts in the field are selected to sit on a review panel, called a "study section"
- The the panelists each read up to 10 different proposals in advance of the panel.
- Each panelist writes a review document (with scores) for each proposal he/she reads, and submits the reviews in advance of the meeting
- The top 50% of proposals by score are discussed at the meeting, and all panelists provide a score
- The program managers make funding decisions, and the results and review documents ("summary statement") are provided to the proposer.

review content

- A list of evaluation criteria, each one followed by a score from 1 (best) to 9 (worst)

  Significance, Investigator(s), Innovation,
  Approach, Environment

- A statement of overall impact (usually a paragraph or two)

- For each of the review criteria above, create a bulleted list of strengths and weaknesses. Usually no more than a few bullets, and "none" is acceptable.

- NIH reviewers also write about human subjects, vertebrate animals, biohazards and budget, but these are not scored.

see example summary statements (to be posted)

scoring system

Impact	Score	Descriptor	Additional Guidance on Strengths/ Weaknesses
High	1	Exceptional	Exceptionally strong with essentially no weaknesses
	2	Outstanding	Extremely strong with negligible weaknesses
	3	Excellent	Very strong with only some minor weaknesses
Medium	4	Very Good	Strong but with numerous minor weaknesses
	5	Good	Strong but with at least one moderate weakness
	6	Satisfactory	Some strengths but also some moderate weaknesses
Low	7	Fair	Some strengths but with at least one major weakness
	8	Marginal	A few strengths and a few major weaknesses
	9	Poor	Very few strengths and numerous major weaknesses

Minor Weakness: An easily addressable weakness that does not substantially lessen impact
Moderate Weakness: A weakness that lessens impact
Major Weakness: A weakness that severely limits impact