Bioengineering Day Poster Addendum (ABET questions)

1. **Desired Needs**

- Quantify mechanical work in EoE patients to provide an accurate assessment of swallowing efficiency in HRIM using biomechanical metrics
- Validate impedance derived measurements against CSAto evaluate distensibility of swallowing
- Extend shelf life and consistency of swallow gel to improve reliability of HRIM test across each patient

2. **Major Constraints**

- Safety/Regulatory Affairs: Potential adverse patient reaction in patients when swallowing the Gel
- Risks: Inconsistent conductivity and viscosity measurements for gel samples, bacterial contamination or allergens in gel components causing mild irritation
- Global Impact: Slow research throughput can directly impact how quickly patients complete diagnosis and receive appropriate treatment.
- Manufacturability: Reformulating gel to improve property consistency and extend shelf life and Integrating ultrasound based analysis, supported by reproducible MATLAB scripts
- Quality Control/Marketability: Standardized gel preparation to ensure batch to batch consistency. Reproduce software workflows to support clinical trials

3. **Engineering Standards**

- ISO 10993-1 framework for assessing biocompatibility of material coming in contact with human body
- **Standard Constraint:** Patient safety, reproducibility, signal reliability, timing, data integrity

4. **Ethical, Environmental, or Societal concerns**

- Patient discomfort or harm if procedures are not performed correctly
- Ethical responsibility to ensure accurate interpretation of data so results are not misleading

5. **Active Teamwork and Leadership in your design group**

- Team members contributed diverse perspectives and knowledge across biomechanics, software, and clinical relevance.
- Each subproject was led by different members based on interests and strength.
- Clear goals were established and revisited regularly every week in team meetings to stay on track.
- Team members and Senior design mentors gave feedback

6. **Motivating Factors**

- Patients experience real pain and misdiagnosis relevant to their disease condition.
- Open ended questions from project encouraged independent problem solving/skill building
- Reinforced importance of iteration, patience, and adaptive thinking.

7. **innovative and/or entrepreneurial ideas**

- Development of a clinical software added feature that quantifies mechanical work from standard HRIM data.