# Abstract Demo!

By the SLB Outreach Committee
Greater San Diego Science & Engineering Fair
January 16, 2021

# Abstract template

- **Paragraph 1: Purpose of the Investigation -** why are you doing this? Introduce the problem, and your hypothesis
- **Paragraph 2: Procedure -** how did you do it?
  - General methods, highly summarized
- **Paragraph 3: Results** - what did you find?
  - Mostly results that directed toward your hypothesis
  - Other interesting results that you can discuss in depth
- **Paragraph 4: Conclusions** Short summary in 1 – 2 sentences
  - Includes further recommendations, ways to expand

# How to Write a Strong Abstract:

## Examples of Paragraph 1: Purpose of the Investigation

- Viruses, such as those that cause colds and influenza, spread via droplets of mucus produced when an infected person sneezes or coughs. Using thick and thin mucus and a model sneeze, the hypothesis was that thin mucus will travel farther than thick mucus.

- Worldwide, over 200 million people have significant visual impairment and 40+ million are completely blind.  High costs and limitations of current advancements and devices, such as transplants and canes prevent optimal visual aid. The purpose of this project is to create a jacket with built-in sensors and micro-vibration motors for the visually-impaired to  efficiently navigate their surroundings.

## Examples of Paragraph 2: Procedure

- Thin and thick mucus were represented by 1-milliliter volumes of colored water or a mixture of corn syrup and gelatin, respectively. Fluid was squirted from a plastic dropper with enough force to model a sneeze. Each sample was analyzed for maximum distance traveled and distribution of droplets. Data was analyzed using a two-tailed t test.

- HC-SR04 sensors and vibration motors were connected to an Arduino, coded with a program that instructs the vibration motors and placed on the front, back, and sides of the jacket. The jacket was tested moving towards large objects such as walls and smaller objects such as tables to measure vibration distances.

# How to Write a Strong Abstract: A Tutorial

## Examples of Paragraph 3: Results

- Compared to thick mucus (mean distance of 110.8 cm, SD 103.7 cm, n=26/group), thin mucus squirted a greater mean distance (302.4 cm, SD 45.06 cm, n=26/group, $p<0.0001$, Cohen's d 2.395). Thick mucus traveled a maximum of 310 cm. Thin mucus traveled a maximum of 400 cm. Thick mucus also formed fewer visible droplets, and droplets concentrated closer to the origin of the "sneeze."

- The sensors and vibration motors in the jacket detected large objects (walls) from an average distance of 3.2 meters while detecting objects (approximately 500 cm in height from the ground) at an average distance of 410 cm. Detection (jacket vibration) was reduced by 90% for objects that were lower than 400 cm tall.

# How to Write a Strong Abstract: A Tutorial

## Examples of Paragraph 4: Conclusions

- This study showed that thin mucus travels farther than thin mucus in the plastic dropper sneeze model. Thin mucus traveled a maximum of 400 cm, suggesting a potential spread of virus-containing particles of up to 4 meters in our tests. Further experiments will clarify differences in viscosity between thick and thin mucus and potential differences in droplet size.

- The jacket was successful in providing ample notification to the visually impaired when approaching large objects. When objects were 500 cm above ground level, the effectiveness dropped, and there wasn't enough notification for the wearer approaching objects smaller than 400 cm.  Further modifications of the jacket needed to be able to detect small objects at lower heights effectively.

# Full Abstract Example 1

Viruses, such as those that cause colds and influenza, spread via droplets of mucus produced when an infected person sneezes or coughs. Using thick and thin mucus  and a model sneeze, the hypothesis was that thin mucus will travel farther than thick mucus. Thin and thick mucus were represented by 1-milliliter volumes of colored water or a mixture of corn syrup and gelatin, respectively. Fluid was squirted from a plastic dropper with enough force to model a sneeze. Each sample was analyzed for maximum distance traveled and distribution of droplets. Data was analyzed using a two-tailed t test. Compared to thick mucus (mean distance of 110.8 cm, SD 103.7 cm, n=26/group), thin mucus squirted a greater mean distance (302.4 cm, SD 45.06 cm, n=26/group, $p<0.0001$, Cohen's d 2.395). Thick mucus traveled a maximum of 310 cm. Thin mucus traveled a maximum of 400 cm. Thick mucus also formed fewer visible droplets, and droplets concentrated closer to the origin of the "sneeze." This study showed that thin mucus travels farther than thin mucus in the plastic dropper sneeze model. Thin mucus traveled a maximum of 400 cm, suggesting a potential spread of virus-containing particles of up to 4 meters in our tests. Further experiments will clarify differences in viscosity between thick and thin mucus and potential differences in droplet size.

# Full Abstract Example 2

Worldwide, over 200 million people have significant visual impairment and 40+ million are completely blind. High costs and limitations of current advancements and devices, such as transplants and canes prevent optimal visual aid. The purpose of this project is to create a jacket with built-in sensors and micro-vibration motors for the visually-impaired to efficiently navigate their surroundings. HC-SR04 sensors and vibration motors were connected to an Arduino, coded with a program that instructs the vibration motors and placed on the front, back, and sides of the jacket. The jacket was tested moving towards large objects such as walls and smaller objects such as tables to measure vibration distances. The sensors and vibration motors in the jacket detected large objects (walls) from an average distance of 3.2 meters while detecting objects (approximately 500 cm in height from the ground) at an average distance of 410 cm. Detection (jacket vibration) was reduced by 90% for objects that were lower than 400 cm tall. The jacket was successful in providing ample notification to the visually impaired when approaching large objects. When objects were 500 cm above ground level, the effectiveness dropped, and there wasn't enough notification for the wearer approaching objects smaller than 400 cm. Further modifications of the jacket needed to be able to detect small objects at lower heights effectively.

# How to Write a Strong Abstract: A Tutorial

**Best Practices – Revision is KEY**

- Leave out unnecessary details and discussions
- Use the past tense in descriptions
- Write in short, but complete sentences
- Avoid extra jargon and any slang
- Check for correct spelling, grammar, and punctuation!