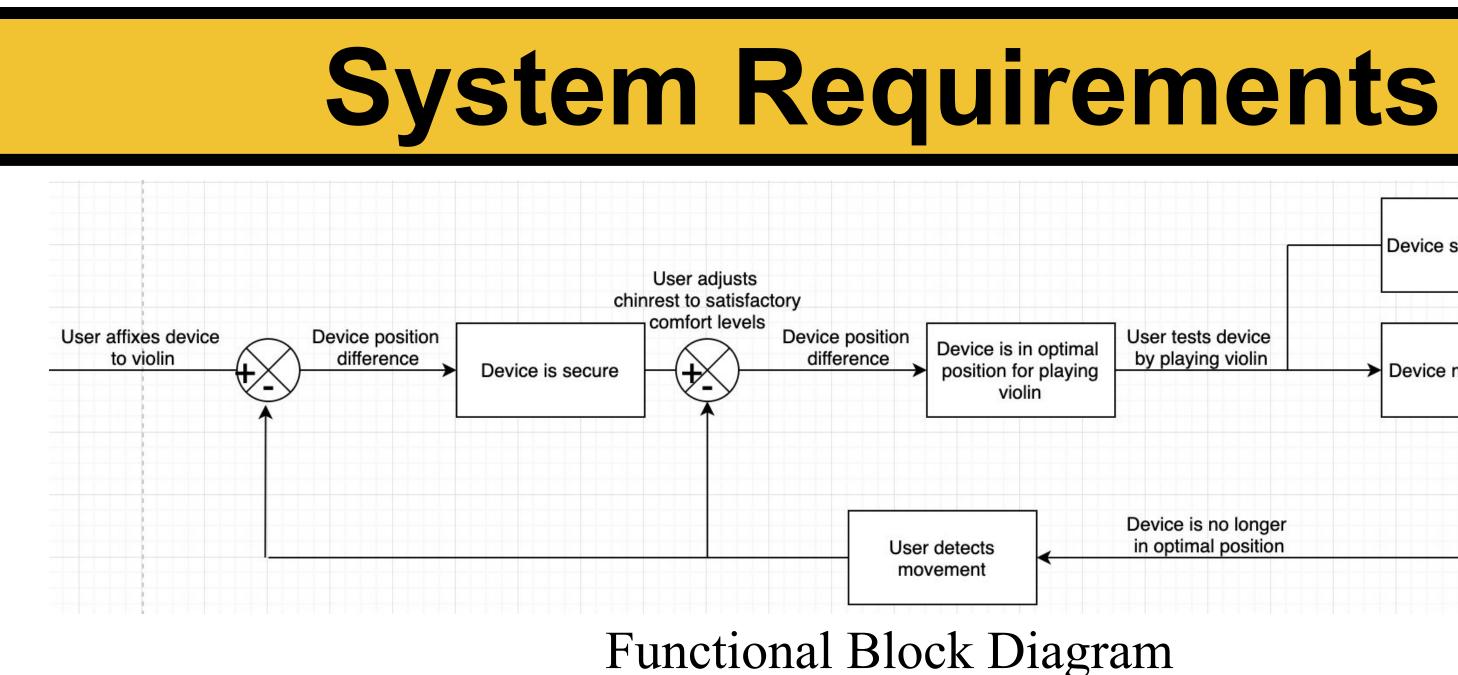


Team Forte **ENME 444 Mechanical Engineering Systems Design Spring 2020** Jordan Armstead, Catherine Chonai, Helen Rogers, Nathaniel Zucker

Project Scope

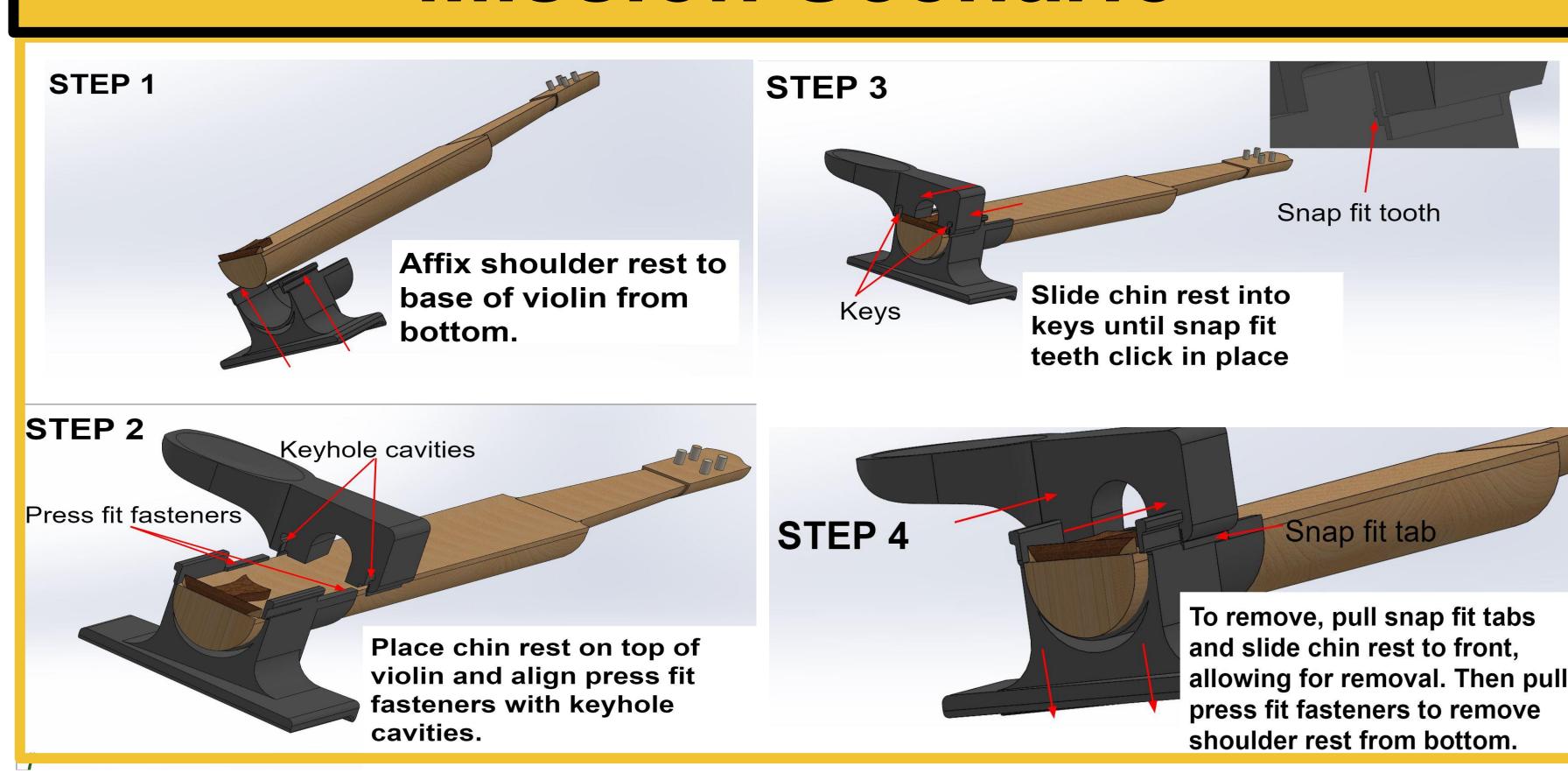
Background: In order for violinists to play comfortably (minimal neck strain, good posture, etc.), a support or rest is typically installed on the instrument. These rests vary in design, but commonly have points of contact at the musician's shoulder and chin. For standard violins, there are several options to choose from on the market. However, Dr. Topoleski has a custom miniature "pocket" violin, whose only support is a small inflatable donut-shaped tube that fits on the instrument's base. This device, as stated by Dr. Topoleski, is unsatisfactory; it is difficult to inflate, uncomfortable, and lacks visual appeal.

Our Task: To build a support system designed specifically for this violin. Additionally, he asks that a new bow be fabricated due to the small size of his current bow. Finally, these components must all have the ability to be stored in, or easily attached to the instrument's carrying case (a segment of PVC pipe).

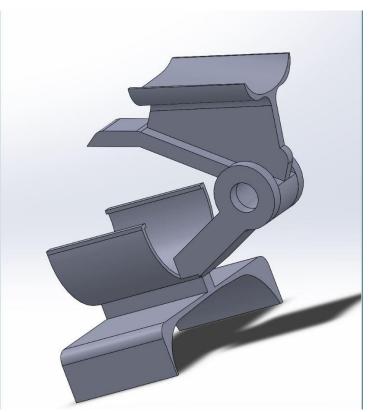


After meeting with Dr. Topoleski, the team was able to assess the key requirements for the system, which are:

- Support violin between chin and shoulder
- Attach without damage
- Shall either fit within case or have a seperate carrying case that shall attach to the current case
- Chin and shoulder rest shall weigh no more than ¹/₄ lb
- Comfortable
- Ease of assembly



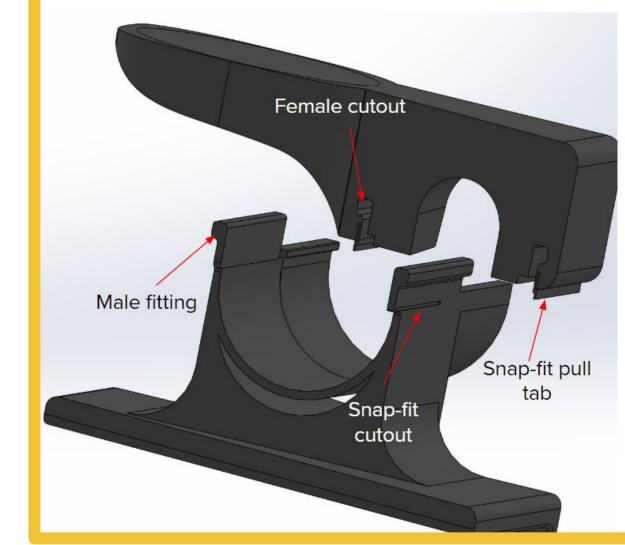
Device stays in place	User plays violir comfortably
➤ Device moves/ shifts	



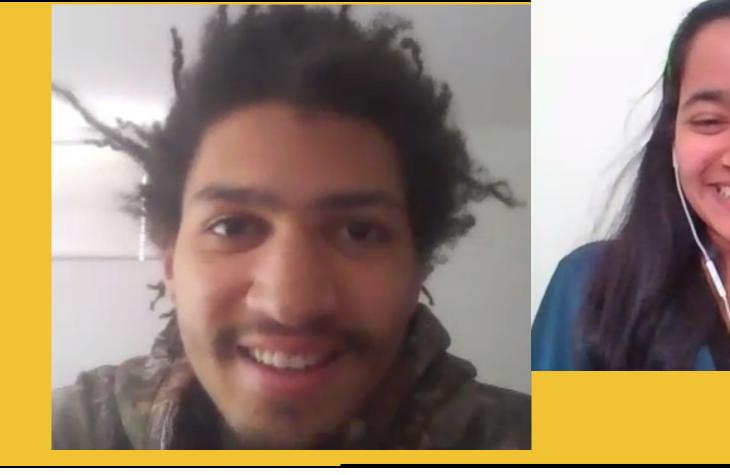
Initial Concept (Left) • Comprised of upper and lower component, attached by hinge • Attaches to violin via hemispherical press fitting

Second Design (Right)

- Eliminates hinge
- Uses traditional violin clamp
- Mitigates neck strain with offset chin rest design

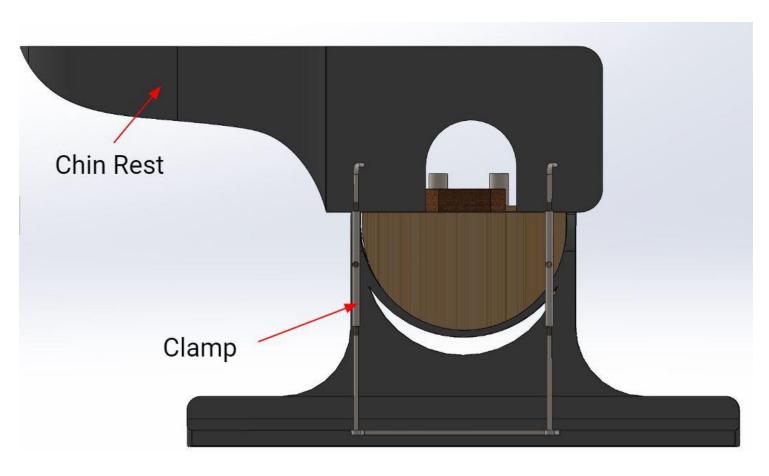


- Less parts



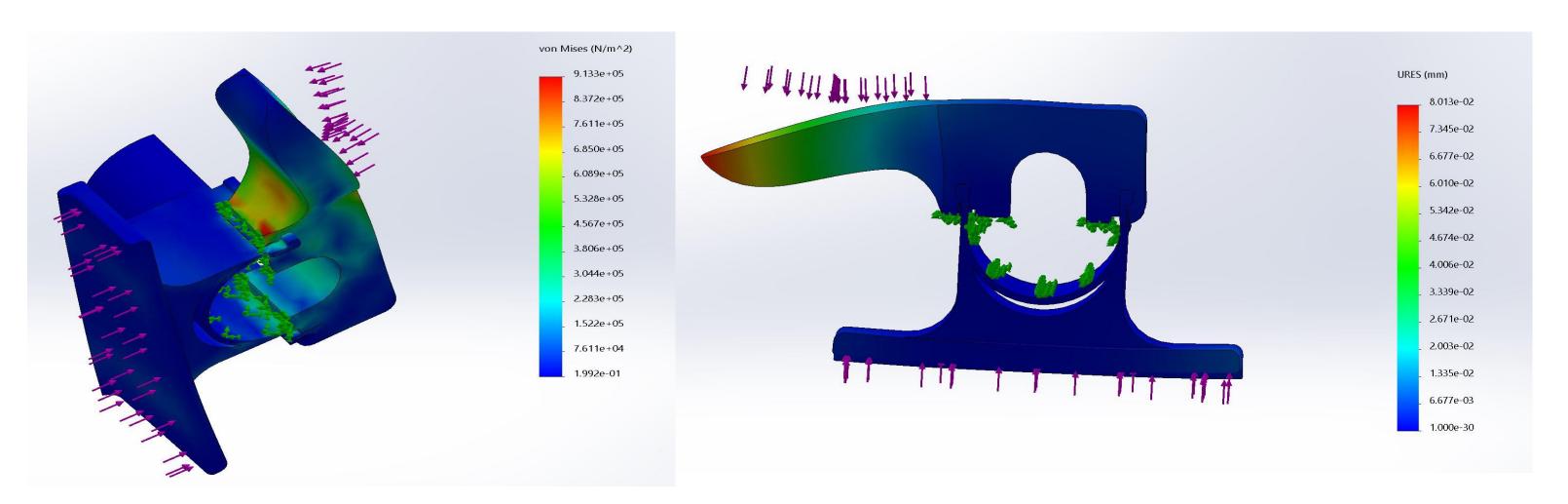
Mission Scenario

Design Evolution

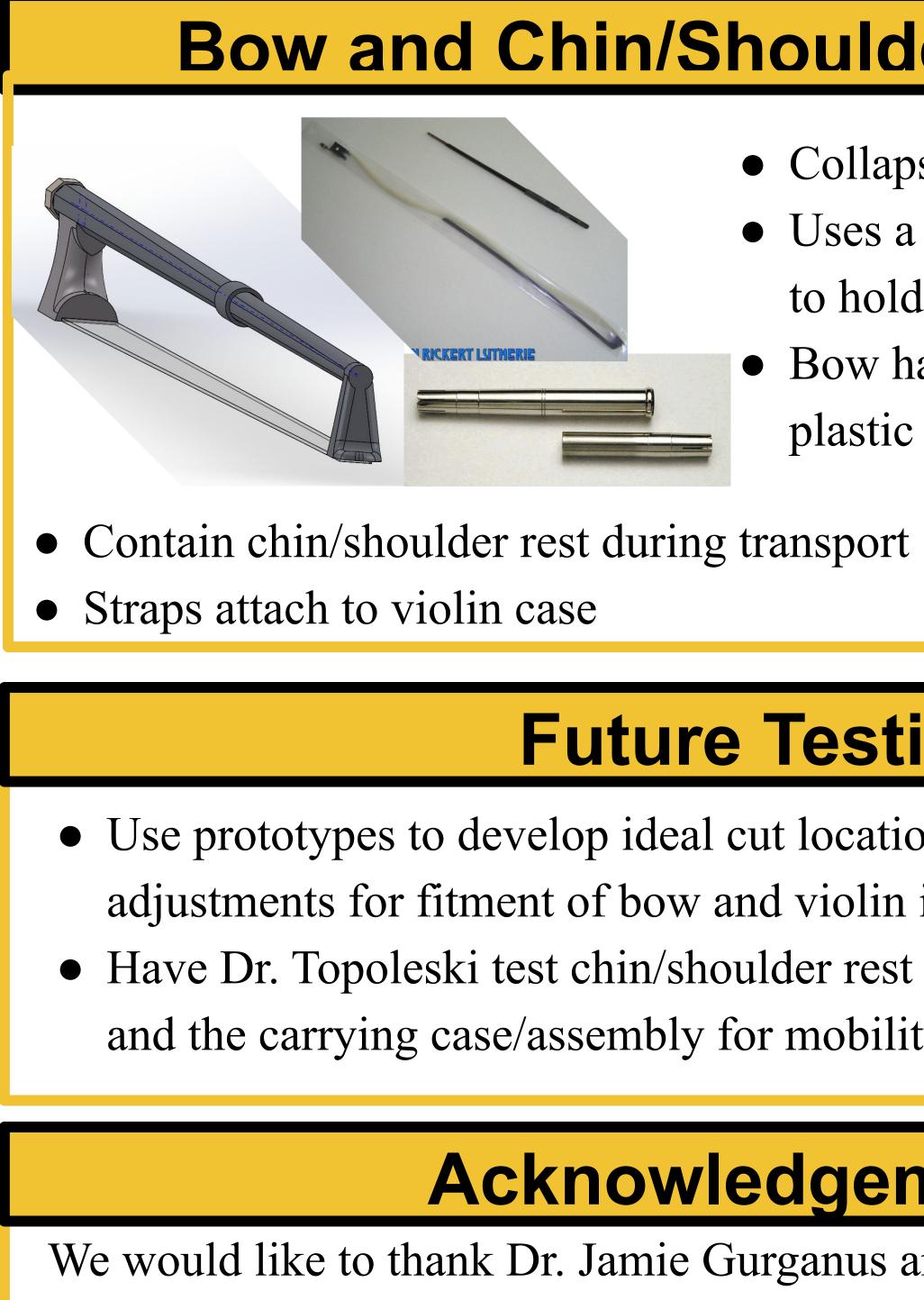


Final Design (Left) • Eliminates need for clamp • Utilizes fitted inserts

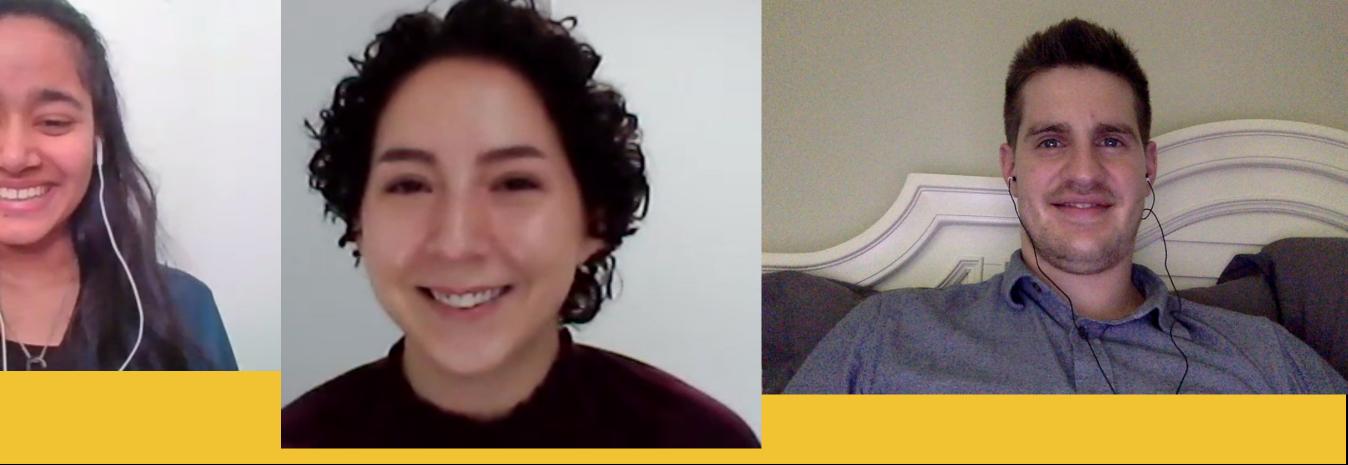
• More convenient assembly



Stress concentration: areas of higher stress are seen in red and yellow near the corners and bottom of chin piece with a maximum stress 0.91 Mpa



We would like to thank Dr. Jamie Gurganus and Dr. Tim Topoleski for their contributions.



Analysis

Displacement: occurs primarily on the chin rest with a maximum displacement of 0.08mm

Bow and Chin/Shoulder Rest Case

- Collapsible for travel purposes
- Uses a ferrule from a fly fishing rod to hold the two segments together
- Bow hair will be stored within plastic sleeve



Future Testing

• Use prototypes to develop ideal cut location for bow, and required adjustments for fitment of bow and violin into PVC case • Have Dr. Topoleski test chin/shoulder rest for comfort and stability, and the carrying case/assembly for mobility and traveling convenience

Acknowledgements