PANEL SESSION 2
3:30-4:30pm, Friday, October 2
https://meet.google.com/ror-jost-jxv

Panel Chair: **Kyra Bowar '21**

Ana Zaalishvili '22, **Anna Teurman '22** – "Study of Cosmic Ray Muons in the Upper Atmosphere"

Muon count, altitude and angle were measured using a high-altitude balloon. Muon detectors were built, calibrated and assembled for flight in a payload attached to the balloon, which was filled with hydrogen and let go into the atmosphere. Preliminary results show that 15 to 30 km above the ground the count rate of muons become uniform across all angles measured. This supports the theory that when created, muons are travelling in all directions. However, only muons that travel vertically are able to reach the surface of the earth due to their short lifetime.

Ben Menke '22 – "The Effects of Voter Turnout in U.S. Elections"

Political scientists and politicians have long debated the relationship between voter turnout and electoral outcomes. The predominant theories, the conventional and two-effects model, both offer compelling explanations. Analyzing the outcomes of U.S. Presidential and Senate elections from 2000 to 2018, I find that increased voter turnout is associated with a higher vote share and winning percentage for Democratic candidates. These results are in agreement with the conventional model. Moreover, I use measurements of legislator ideology to find that turnout does not significantly influence congressional voting behavior within either party.

Sara Cronk '22 – "Developing Theatre & Dance Audiences at Small Liberal Arts Colleges: A Case Study at Gustavus Adolphus College"

"It really doesn't matter how good your show is, without an audience, it's all for nothing" - Douglas Mayo
The purpose of this study is to better understand the audience and potential audience who attend productions sponsored by the Department of Theatre & Dance at Gustavus Adolphus College. Specifically, the project studied attendance patterns, how well different marketing strategies have worked, and what the department can do to increase attendance. Using both analysis of existing ticket sales data and a survey distributed to ticket purchasers and the general Gustavus body, it was determined, amongst other things, that while Gustavus students and alumni are attending in relatively high numbers, attendance from the St. Peter community has the most potential for growth. The study also analyzed audience preferences in terms of genres and art forms, as well as marketing strategies including engagement with social media and news outlets. Our study concludes with recommendations to assist the department in building and growing its audience base, while increasing visibility in the community and beyond.

Filip Bělík '22, Ha Le '22 – "One-Dimensional Port-and-Sweep Solitaire Armies"

Peg solitaire is a puzzle game in which a player attempts to hop pegs, removing hopped pegs from the board, to reduce an initial board down to one peg. It is a puzzle with extensive mathematical research and literature revealing connections to modular 3 invariants, the Fibonacci numbers, the golden ratio, and more. Port-and-Sweep Solitaire (PaSS) was created in 2010 and differs from peg solitaire in the number of pegs or counters that can be on a single space and the type of moves available to the player. The one-dimensional army problem involves working with configurations of pegs and using valid solitaire moves in the proper order to advance the army of pegs as far to the left of its starting position as possible. While the standard peg solitaire result is quite uninteresting, a maximum advance of one space, the problem in PaSS is more complex. With the use of a non-increasing board value function, contradiction through deduction, and linear algebra, we present a definite upper-bound on the advances of PaSS armies, minimal configurations of armies that progress as far as has been shown possible, and a solution to the PaSS army problem given assumptions that match all current army advances.