2018 MinneMUDAC CHALLENGE

<u>Backstory</u>

The State of Minnesota had the highest voter turnout rate in the nation for the 2016 election. Many factors influence voter turnout, e.g. demographics, who is running, presidential/midterm election cycle, etc. The importance of voter turnout is often discussed in the run up to elections. Some believe high voter turnout ensures a more fair representation of the entire electorate; whereas, others believe high voter turnout may indicate more uninformed voters are casting a ballot. The goal of this year's challenge is to understand the factors and characteristics that drive voter turnout.

<u>The Challenge</u>

The 2018 MinneMUDAC Challenge will focus on an investigation of the factors/characteristics that influence the Number of Voters who Cast a Ballot in the 8 Congressional Districts across Minnesota.

Primary Outcome: Number of Voters who Cast a Ballot

The Number of Voters who Cast a Ballot will be the primary outcome for the 2018 MinneMUDAC Challenge as voter turnout requires an estimate of the number of eligible voters. The State of Minnesota currently has about 750 precincts (also known as voting districts) that are combined into 8 Congressional Districts. Participants, in all but the Novice Division, will be required to submit predictions for the Number of Votes Cast in each of the 8 Congressional Districts for the 2018 Election. The accuracy of these predictions will be taken into consideration when determining the overall winner for the Undergraduate, Graduate, and Open Divisions.

Possible Considerations for each Division
- NOVICE
    - Characterize the distribution of Number of Voters who Cast a Ballot for past elections across the 8 Congressional Districts in Minnesota
    - Identify factors, e.g. age, sex, ethnicity, education, income, health insurance coverage, employment opportunities, common industry sectors (e.g. Agriculture, Construction, Manufacturing, Finance and Insurance, etc), etc. that appear to influence the Number of Voters who Cast a Ballot in past elections across the 8 Congressional Districts in Minnesota
    - How has the Number of Voters who Cast a Ballot changed over time across the 8 Congressional Districts in Minnesota?
    - Identify characteristics that are most likely to contribute to the outcomes for all/some of the following races for the 2018 election
        - Minnesota's 8 seats in the United State House of Representatives -- one from each of the 8 Congressional Districts

- ■ Minnesota's 2 seats in the United State Senate
  - ■ Minnesota Governor

- ● UNDERGRADUATE (Novice Considerations and the following)
  - ○ Congressional Districts in the State of Minnesota are comprised of several precincts. Characterize the variation across precincts in the Number of Voters who Cast a Ballot from past elections within each of the 8 Congressional Districts in Minnesota.
  - ○ Identify factors, e.g. age, sex, ethnicity, education, income, health insurance coverage, employment opportunities, common industry sectors (e.g. Agriculture, Construction, Manufacturing, Finance and Insurance, etc), etc. that appear to influence the Number of Voters who Cast a Ballot across relevant geographic units (e.g. precincts, counties, census tracts, census blocks, etc) within each of the 8 Congressional Districts in Minnesota

    Comment: The consideration of relevant geographic units should be done with care as the makeup of congressional districts may change due to congressional redistricting, some counties with large populations may be split into more than one congressional district, etc.
  - ○ Build/construct predictive models for the Number of Voters who will Cast a Ballot in the 2018 election for each of the 8 Congressional Districts in Minnesota.

- ● GRADUATE / OPEN (Undergraduate Considerations and the following)
  - ○ Consider the following party affiliations designations -- Democrat, Republican, and Third Party. Characterize the variation in the Number of Votes Cast for each Party across the precincts within each of the 8 Congressional Districts in Minnesota.
  - ○ Characterize the association of various demographic factors on the Number of Votes Cast for each Party across relevant geographic units within each of the 8 Congressional Districts in Minnesota
  - ○ Build/construct predictive models for the Number of Votes Cast for each Party in the following 2018 Elections in Minnesota
    - ■ The 8 United States House of Representatives seats in Minnesota -- one from each of the 8 Congressional Districts
    - ■ The 2 United States Senate seats in Minnesota
    - ■ The Minnesota Governor Race

    Comment: Participants will be asked to submit a total of 33 predictions: 1) 3 parties x 8 US House Seats, 2) 3 parties x 2 US Senate Seats, 3) 3 parties x 1 MN Governor Race.
  - ○ Some races in Minnesota are receiving more attention than others because of the potential flipping of a seat (switching from Republican-to-Democrat or vise versa). Which races are most likely to flip a seat? How did you make this determination?

Prediction Accuracy

Participants in the Undergraduate, Graduate, and Open Divisions will be asked to submit predictions for the Number of Votes Cast during the 2018 election within the State of Minnesota.

Prediction Accuracy (Undergraduate Division): Absolute percent error in the number of votes cast across the 8 congressional districts

$$\sum_i \frac{|\text{Predicted Number of Voters who Cast a Ballot}_i - \text{Actual Number of Voters who Cast a Ballot}_i|}{\text{Actual Number of Voters who Cast a Ballot}_i}$$

where

   i : represents the 8 Congressional Districts in the State of Minnesota

Prediction Accuracy (Graduate & Open Divisions): Absolute percent error in the number of voters who cast a ballot for the three designated political affiliations (Democrat, Republican, Third Party) for each of the 8 US House Seats, 2 US Senate Seats, and MN Governor seat.

$$\sum_{i=1}^{8}\sum_{j=1}^{3} \frac{|\text{Predicted Number of Voters who Cast a Ballot for US House Seat}_{i,j} - \text{Actual Number of Voters who Cast a Ballot for US House Seat}_{i,j}|}{\text{Actual Number of Voters who Cast a Ballot for US House Seat}_{i,j}} +$$

$$\sum_{k=1}^{2}\sum_{j=1}^{3} \frac{|\text{Predicted Number of Voters who Cast a Ballot for US Senate Seat}_{k,j} - \text{Actual Number of Voters who Cast a Ballot for US Senate Seat}_{k,j}|}{\text{Actual Number of Voters who Cast a Ballot for US Senate Seat}_{k,j}} +$$

$$\sum_{j=1}^{3} \frac{|\text{Predicted Number of Voters who Cast a Ballot for MN Governor}_{j} - \text{Actual Number of Voters who Cast a Ballot for MN Governor}_{j}|}{\text{Actual Number of Voters who Cast a Ballot for MN Governor}_{j}}$$

where

   i : represents the 8 US House Seats -- one from each Congressional Districts in the State of Minnesota
   j : represents the political affiliations of Democrat, Republican, and Third Party
   k : represents the 2 US Senate seats in the State of Minnesota

Potential Data Sources

The 2018 MinneMUDAC Challenge requires participants to obtain their own data. The data sources listed here are a reasonable place to start for the collection of your data. This list is by no means a definitive list and we encourage participants to use other relevant data throughout this challenge, e.g. polling data, social media data, etc. Data sources must be referenced when presenting outcomes to competition judges.

Office of the Minnesota Secretary of the State: https://www.sos.state.mn.us/
   ● See Elections Results under Elections and Voting for outcomes from recent elections
   ● See Data & Maps under Election Administration & Campaigns for Historical Statistics, GIS Data for mapping, etc.

Comment: Registered voters lists -- which may include a historical record of voting for an individual can be requested from the the State of Minnesota for a small fee. However, the 2018 MinneMUDAC Challenge does *not* meet the criteria specified by Minnesota Statutes 201.091 . The 2018 MinneMUDAC Challenge is focused on voter turnout at the Congressional District level and individual level data should not be used.

American Fact Finder: https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml
- Widely available Census Data from the United States Census Bureau
- Select Advanced Search to build a query to obtain desired Census Data
  - Census Data at the Congressional District level may be obtained by specifying Congressional District under Geographies
  - More specific census data can be obtained by selecting County, Census Tract, or Block Group levels under Geographies. If data at this level is used, then crosswalk files will likely be necessary to relate this census data to the congressional districts / voting districts / precincts in the State of Minnesota. For example, the following link provides a crosswalk file to relate Census Blocks to Congressional Districts or Voting Districts for a particular state - https://www.census.gov/geo/maps-data/data/baf.html

Other Potential Data Sources
- Library of Congress - U.S. Election Statistics: A Resource Guide: https://www.loc.gov/rr/program/bib/elections/statistics.html
  - See Section titled Election Studies and Data, Exit Polling, Voting and Registration for a variety of resources centered around election data and statistics
- Minnesota State Demographic Center: https://mn.gov/admin/demography/
  - Select Data by Topic to obtain data on population, age, ethnicity, education, income, etc.
  - See Map & Viz Gallery for various visualizations of demographic data for the State of Minnesota
- Basic Demographics by Congressional District for the State of Minnesota: https://www.census.gov/mycd/?st=27
  - Easy to use tool for gathering basic demographic information for each Congressional District in Minnesota.
- Pew Research Center - Publications on Voter Demographics http://www.pewresearch.org/topics/voter-demography/
  - Publications centered on the trends in voting over the past 15 years