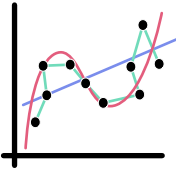# Gaps, Missteps, & Errors in Statistical Data Analysis

BMB 961-301 | 1 Credit | Nov 5 – Dec 5 2018 | MW 12:40-2:00p

Dr. Arjun Krishnan | arjun@msu.edu | @compbiologist

This is an advanced short course designed to:

1) Discuss **common misunderstandings** and **typical errors** in the practice of statistical data analysis.

2) Provide a **mental toolkit for critical thinking and enquiry** of analytical methods and results.

Classes will involve **lectures**, **discussions**, **hands-on exercises**, and **homework** about concepts critical to the day-to-day use and consumption of quantitative/computational techniques. Topics include:

- Underpowered statistics
- Pseudoreplication
- P-hacking & multiple hypothesis correction
- Difference in significance & significant differences
- Base rates & permutation tests
- Regression to the mean
- Descriptive statistics & spurious correlations
- Estimation of error and uncertainty

Prerequisites: This is _not_ a course in statistics or programming. We will assume: 1) Familiarity with basic statistics & probability. 2) Ability to do basic data wrangling, analyses, & visualization using R or Python.

- Strongly recommended MSU courses include CMSE 201 and CMSE 890 Sec 301-or-304 and Sec 302.
- Contact Dr. Krishnan for free online preparatory resources.

Interested students are _strongly_ encouraged to:

1) **fill-out the course survey** & 2) **contact Dr. Krishnan** to find out if this course is right for them.

Final student presentations: Dec 10 & 12 | Course survey: bit.ly/bmb961_nov18_survey