# BENJAMIN DRAVES

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## EDUCATION

**Lafayette College**                                                     *Overall GPA: 3.86 (In Major: 3.80)*
B.S. in Mathematics                                                       Degree expected May 2017

**University of Mount Union**                                             *GPA: 4.0*
32 Credit Hours Earned                                                   January 2012 - May 2014

**Alliance High School**                                                  *GPA: 4.0*
Valedictorian                                                             August 2010 - May 2014

## RESEARCH

**Treelet Covariance Smoothers**                                          June 2016 - Present
Lafayette College - Mathematics Department

Developed and analyzed a class of smoothers which extends wavelets to non-smooth signals and, through a construction of multi-scale bases, uncover underlying structure in high dimensional, noisy data. Specifically, we look to improve the estimation of relatedness and heritability of phenotypic traits in genetic studies by bettering the estimation of noisy relationship matrices (*ongoing*). Research mentor: Dr. Trent Gaugler. Funded by EXCEL scholarship committee ($3,000), Lafayette College.

**Tempo of the Times**                                                    June - August 2015
Lafayette College - Digital Humanities Group

Conducted original research examining the connection between musical compositions and social well-being. Statistical models were built to analyze and predict musical qualities as a function of political events. Research was presented at Bucknell University Digital Scholarship Conference and was accepted for presentation at NCUR 2016. Research supervisor: Dr. Emily McGinn. Funded by Lafayette College's Mellon Grant for Digital Humanities ($3,000).

## PUBLICATIONS & PRESENTATIONS

### Publications

Draves, B. and Gaugler. T (in preparation). *Using Treelet Covariance Blocking to Refine Estimation of Heritability*. Intended submission to *Statistical Applications in Genetics and Molecular Biology*.

### Presentations

*Treelet Covariance Smoothers*. Lafayette College, Fall 2016.

*Extending Treelet Covariance Smoothing for Better Estimation of Heritability*. Lafayette College, Summer 2016.

*Community Needs Assessment: Easton Area Neighborhood Center*. Lafayette CBLR Expo, March 2016.

*Tempo of the Times: How the social climate affects your iTunes library*. Poster & Expository Presentation. Bucknell University Digital Scholarship Conference. Bucknell University, Fall 2015.

*Tempo of the Times: Why the Gulf War Saved Rock & Roll*. Lafayette College, Summer 2015.

## RELEVANT COURSEWORK

| Mathematics | Statistics | Computer Science |
|---|---|---|
| Honors Thesis (*ongoing*) | Time Series Analysis **A** | Analysis of Algorithms (*ongoing*) |
| Real Analysis II (*ongoing*) | Mixed Effects Models (*ongoing*) | Data Structures & Algorithms **A** |
| Real Analysis I **A** | Survey Design and Analysis **A** | Digital Media **A** |
| Complex Analysis **B** | Mathematical Statistics **A** | Computational Simulation **A** |
| Vector Spaces **A** | Probability **A** | |
| | Operations Research **A** | |

## INSTRUCTION

**Supplemental Instructor**                                     September 2016 - Present

Applied Statistics SI. Prepared and conducted review sessions and individually tutored students pertaining to the methods covered in the course.

**Calculus Cavalry Tutor**                                         September - May 2015

Tutored calculus students individually (3-6 hours weekly) in six independent calculus related courses.

**Applied Statistics Laboratory TA**                               January 2016 - Present

Worked individually with students - teaching R and basic statistical computing methods in a hands-on setting.

## CONSULTING

**Crayola.com**                                              September - December 2015

Applied mixed effects models to Crayola sales data to optimize online sales and advise marketing strategies. Findings were presented to the Vice President of Marketing Strategies. A final report was submitted and accepted by Crayola in January 2016.

**Victaulic**                                                      January - May 2016

Implemented linear programming methods to optimize supply chain decisions. Models were constructed on recorded shipping costs provided by Victaulic. Findings were presented to the Head of Supply Chain management. A final report was submitted and accepted by Victaulic in May 2016.

**Easton Area School District**                                   January - April 2016

Analyzed the effects of the Classroom Diagnostic Tool on students' Keystone exams to inform circular design of EASD. Results were presented to the High School Principles and Mathematics Staff of EASD. A final report was submitted and accepted by EASD in April 2016.

**Easton Area Neighborhood Center**                            January 2016 - Present

Designed, piloted, and distributed a public opinion survey to inform future programming of EANC. The first iteration of the survey was completed in March 2016.

## ADDITIONAL PROJECTS

**PTrees**                                                         June 2016 - Present

A software tool that creates complex pedigree structures and assigns individual level genetic panels corresponding to the familiar structure. Using basic probabilistic assumptions, a *plink* formatted bed, bim, and fam file are then generated with an associated visualization of the pedigree structure.

**Twitter Scraping** March 2016 - Present

A project that, through the collection of twitter metadata, creates and tags network - based, natural language data. Scraping tools, constructed in Python and R, are used to collect and clean data for network analysis.

**News Dissemination - An Agent Based Model** January 2016

An agent based model that emulates the dissemination of political stories by new agencies that demonstrate a political bias or skew to equally biased readers. This project was completed as a part of Computational Simulation - Lafayette College, Winter 2016.

**Chutes and Ladders** February - May 2016

A simulation of naive artificial intelligence agents playing a game similar to Chutes and Ladders. Eight AI strategies competed on a three dimensional board where board spaces were implemented using basic data structures. This project was completed a part of Data Structures and Algorithms - Lafayette College, Spring 2016.

## HONORS

Pi Mu Epsilon (Math Honor Society) Member
Dean's List (3 Semesters)
Lafayette College Math Bowl Champion

## PROGRAMMING CAPABILITIES

**Proficient:** Java, R, SAS, Python
**Intermediate:** C, C++, Hive, SQL
**Typesetting:** Latex, Microsoft Office

## ACTIVITIES & LEADERSHIP

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|---|---|
| Student Representative to the Faculty IT & Library Committee | March 2015 - Present |
| Pi Mu Epsilon President (Mathematical Honor Society) | March 2015 - Present |
| Founding Member of the Statistics House | August - May 2016 |
| Mathematics Club Board Member | August 2015 - Present |
| Treasurer of College Democrats | August 2015 - Present |