

# Brett A. Davis

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## Skills

- Proficient in MATLAB™
- Proficient in Microsoft Office Suite
- Familiar with KEGG, Protein Data Bank (PDB), and Swiss PDB Viewer
- Experience with AutoDock Vina, BLAST®, SWISS-MODEL, Foldit, Aspen Plus®, and KBase
- Training in aseptic techniques
- Experience working in a BSL-2 lab
- Excellent written and verbal communication skills
- Excellent interpersonal skills; able to work with all levels of managers, associates, and clients

## Education

### **Villanova University – College of Engineering**

Master of Science in Biochemical Engineering

Graduation Date: May, 2016

### Coursework

- **Thesis:** “A systems-level investigation of the metabolism of *Listeria monocytogenes*”
- **Protein Engineering:** Proposed an alternative blood substitute by modifying the stability, activity, and purification of *Phascolopsis gouldii* hemerythrin. The project team gained new insight and hands-on experience in computer-aided protein engineering software. This project was also taken beyond the scope of the course and tested in a wet lab.
- **Biomaterials & Drug Delivery:** Students learned about and presented various tissue engineering and biomaterial applications; independently postulated a new biomaterial scaffold that would assist in brain tissue regeneration in patients suffering from traumatic brain injuries.
- **Biochemical Engineering 1 & 2:** Educated on biopharmaceutical upstream and downstream processes including sterilization, separation, and purification; underwent two team projects to research and report the process of manufacturing Humira® (adalimumab).
- **Systems Biology:** Performed *in silico* experiments – modeled the metabolism of select microorganisms (e.g. *E. Coli*), measured growth rate, and conducted gene knockout – to determine the genes and biochemical reactions that are most vital to bacterial survival.

### **University of Missouri (Columbia) – College of Engineering**

Bachelor of Science in Chemical Engineering - Biochemical Emphasis

Graduation Date: May, 2014

## Work Experience

**Trader Joe’s** (Leawood, KS)

October 2016 – Present

*Crew Member*

Trader Joe’s crew members carry out various tasks throughout their shift, which are focused primarily on store products and customer experience. The crew undergoes hourly rotations to keep the day fresh and exciting. A few of the crew’s primary objectives are:

- Providing outstanding customer experience based on the Trader Joe’s Values Guide
- Enthusiastically engaging the customers at checkout and throughout the store
- Constantly educating self on product knowledge and seeking new ways to improve processes
- Maintaining the store by continuously stocking shelves, rotating product, and creating eye-catching displays while following good safety guidelines

The objective of this project was to create the first genome-scale metabolic model for the food-borne pathogen *L. monocytogenes*. Using an *in silico* systems-based approach, the team aimed to identify the bacterial genes most critical to the metabolism of this bacteria. The project was carried out using a MATLAB™ toolbox called COBRA, or Constraint-Based Reconstruction and Analysis. The primary tasks completed for this project are as follows:

- Imported a premature metabolic model for *L. monocytogenes*.
- Gathered genetic information in the KEGG database regarding the bacteria's metabolism.
- Integrated the genetic information into the model.
- Transferred the microorganism's biomass reaction from KBase to the model.
- Simulated growth rate by optimizing the biomass reaction using flux balance analysis.
- Identified and validated those genes, enzymes, and reactions the bacteria needs to survive via essential gene analysis.

After careful literature review, we were able to validate fourteen essential genes for this pathogen. However, this model can still be improved upon by modifying the nutrient conditions the bacteria is exposed to. This may not only generate a realistic growth rate, but also validate additional essential genes. Therefore, a more comprehensive version of this model should contribute to the development of novel treatments for patients infected with antibiotic-resistant strains of *L. monocytogenes*.

**Camp Mitchell (Morrilton, Arkansas)**

Camp Counselor

May 2014 – August 2014

Serving as a camp counselor encompassed maintaining a safe, interactive, and entertaining environment for diverse groups of campers. Camp sessions were divided based on different age groups, adults with disabilities, and children with incarcerated parents. Counselors were assigned a counselor in training (CIT) as well as their own group of campers each week.

- Instructed camp rules during initiation and enforced them throughout the week.
- Attended and participated in daily staff meetings to report and resolve issues.
- Organized and led camp recreational activities such as hiking, fishing, and sports.
- Trained and guided CITs in their pursuit to become a camp counselor.
- Obtained certification from the American Red Cross to serve as a lifeguard.

**Accomplishments/Activities/Awards**

Villanova University

- Member of the Biochemical Technology (BIOT) division of the American Chemical Society (Mid-Atlantic student chapter).
  - Presented thesis project to other students and industry employers during the first Villanova BIOT graduate student poster session.
  - Attended the Iron Hill Brewery networking event in Wilmington, DE where graduate students were able to socialize with each other and employers in the biotechnology industry.
- Coauthor of "A Genome-scale Modeling Approach to Quantify Biofilm Component Growth of *Salmonella Typhimurium*".
- Participated in the chemical engineering department's first summer lecture series where students presented their research to other chemical engineering/bioengineering students and faculty.
- Grading Assistant for "Introduction to Biotechnology" (CHE 5532) and "Bioseparations" (CHE 5533).