

# Jack Welchert

Biosystems Engineering, College of Engineering, University of Arizona  
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## Education

**Master of Science in Biosystems Engineering; July 2019, GPA: 3.57.**  
University of Arizona, Tucson, AZ  
Thesis Title: Hydrodynamic Analysis and Evaluation of a Novel Air Stirred Tank Reactor (ASTR) for Microalgae Production

**Bachelor of Science in Molecular and Cellular Biology, May 2015**  
University of Arizona, Tucson, AZ  
Research Project: Genomic Analysis of the Co-diversification Relationship Between *Eustenopus villosus* and *Centeurea solistialis* Across Varying Landscapes.

**Skills:** 3D modeling, ANSYS simulation, Python programming, mathematical modeling, reactor design, data analysis, surface characterization, analytical chemistry, molecular diagnostics.

## Professional Experience

**University of Arizona, Tucson, AZ 9/2019-Present**  
**Graduate Research Assistant**, Department of Chemical and Environmental Engineering

- Conducts research in the field of surface modification, trace contaminant removal, and water treatment
- Analytical chemistry
- Mentoring undergraduate assistants
- Presenting regular research updates to department and graduate committee

**Banner University Medical Center, Tucson, AZ 7/2020-4/2021**  
**Medical Lab Scientist I**, Virology Department, COVID-19 Unit

- Rapid molecular testing of COVID-19 patient specimens
- Reporting of data to CDC and local agencies
- Reporting critical results to medical staff

**University of Arizona, Tucson, AZ 8/2017-12/2017, 8/2018-12/2018, 1/2019-5/2019**  
**Teaching Assistant**, Plant and Animal Genetics, Intro Molecular Biology, Intro to Scientific Writing

- Teaching lab sections of 30+ students
- Presenting lectures
- Holding office hours and supplemental instruction sessions
- Writing exam questions and grading laboratory reports

**Arizona Genomics Institute, Tucson, AZ 3/2018 - 8/2019**  
**Research Technician**, Wing Lab

- Extracting DNA and RNA from plant and fungal samples
- Preparing DNA and RNA samples for PacBio sequencing
- Bioinformatic analysis of sequence data and genome alignment
- Presentation of data at regular lab meetings

**University of Arizona, Tucson, AZ 8/2017-8/2019**  
**Research Assistant**, Department of Biosystems Engineering

- Conducted research on bioreactor design for microalgal oxygen generation
- Conducted ANSYS simulation of designed bioreactors
- Patented a novel bioreactor component
- Modeled oxygen production as a function of bioreactor hydrodynamics and resources

**Banner University Medical Center, Tucson, AZ**

9/2015-7/2017

**Medical Lab Scientist I**, Virology Department

- Cultured live viral strains and patient clinical samples
- Conducted multiplex DNA and RNA extractions
- Conducted molecular testing to identify pathogens in patient samples
- Wrote safety procedures and technical manuals for high complexity instruments
- Diagnostic equipment maintenance

### **Relevant Experience:**

#### **Patents:**

- *Air Stirred Tank Reactor for Production of Microorganisms and Cell Cultures* , US Pub No: US 2020/0318054 A1 Pub Date: 10/8/2020
- *Intelligent, Transformable Bioreactor for Automated Complex Cell Culture* (Under Review)
- *Mobile Vertical Farm for Automation of Vertical Farming Operations* (Under Review)

#### **Publications:**

- *Analysis of Impeller Velocity and Oxygen Mass Transfer on Specific Growth Rate of C. vulgaris microalgae cells* (In Progress)

#### **Presentations:**

- *Commercialization Potential of High Oxygen Supply Bioreactors*, NSF I-corps program, 2019
- *Thriving not Surviving, Keeping up During COVID*, Impact Leadership Program, University of Arizona, 2019
- Undergraduate Research Poster Session, University of Arizona, 2015

### **Organizations:**

**Controlled Environment Agriculture Student Association**, President

- Analysis and management of crop growth systems.
- Construction and design of low footprint hydroponic systems.
- Growing food for the University campus pantry.
- Presenting controlled environment agriculture to middle schools

**Alpha Epsilon Engineering Honors Society**, Vice President

### **Awards and Scholarships:**

- College of Agriculture and Life Sciences Graduate College Fellowship 2017, 2019
- R. Keith Walden Scholarship, 2019
- University of Arizona Graduate College Fellowship 2018
- Animal and Comparative Biological Sciences Tuition Scholarship 2017
- Agricultural and Biosystems Engineering Tuition Scholarship 2017
- University of Arizona Academic Honorable Mention, 2011