

**Minutes**  
Weber State University  
Board of Trustees Meeting  
Feb. 6, 2018

**Trustee Members:**

Ms. Karla Bergeson (via phone)  
Mr. Marty Carpenter  
Ms. Kearston Cutrubus (Vice Chair)  
Ms. Danielle Croyle  
Ms. Karen Fairbanks  
Mr. Nolan Karras (Chair)  
Ms. Lola Moli  
Mr. Don Salazar  
Dr. Jeff Stephens

**Excused:**

Mr. Scott Parson

**Weber State University Representatives:**

Dr. Charles A. Wight, President  
Dr. Madonne Miner, Provost  
Dr. Norm Tarbox, Vice President for Administrative Services  
Dr. Brad Mortensen, Vice President for University Advancement  
Dr. Bret Ellis, Vice President for Information Technology  
Dr. Brett Perozzi, Interim Vice President for Student Affairs  
Mr. Shane Farver, Secretary, Board of Trustees  
Ms. Stephanie Hollist, Deputy General Counsel, University Legal Counsel  
Mr. Richard Hill, General Counsel, University Legal Counsel  
Mr. John Kowalewski, Executive Director, Marketing & Communications  
Dr. Yas Simonian, Dean, College of Health Professions  
Dr. Casey Neville, Assistant Professor, Radiologic Sciences  
Dr. Matthew Nicholaou, Chair, Department of Medical Laboratory Sciences  
  
Ms. Andrea Grover, Information Security Manager, Information Technology  
Ms. Nancy Jarvis; Policy Planning and Assessment; Information Technology

**Guests:**

Dr. David Buhler, Commissioner, Utah System of Higher Education  
Mr. Geoffery Landward, Assistant Commissioner, Utah System of Higher Education

**Press Present:** Mr. Sergio Martinez Beltran, Standard-Examiner

Welcome

- I. The meeting convened at 9:30 a.m.
- II. Vice Chair Kearston Cutrbus, acting in the capacity of chair for this meeting, welcomed those in attendance.

Approval, Ratification of Meeting Minutes (Dec. 5, 2017)

- III. Upon a motion from Nolan Karras seconded by Marty Carpenter, the Board of Trustees approved the meeting minutes for Dec. 5, 2017, and ratified associated committee minutes.

(Dec. 12, 2017 Exec. Committee)

- IV. Upon a motion from Karen Fairbanks seconded by Carpenter, the Board of Trustees ratified the Dec. 12, 2017, Executive Committee Meeting.

WSUSA Report

- V. Lola Moli, student body president, gave the attached report and emphasized Weber Wear Fridays and Utah Student Association's mental health video.

Alumni Association Report

- VI. Danielle Croyle, president of the WSU Alumni Association, gave the attached report and emphasized the Alumni Golf Tournament on June 8. All proceeds from the tournament go to scholarships.

Faculty Report

- VII. Matthew Nicholaou, chair of the Department of Medical and Laboratory Sciences, gave the attached report on student activity within his department. Highlights included student work on CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats) to manipulate genetic code.

President's Report

- VIII. President Charles A. Wight shared the attached report and expressed confidence that WSU trustees and vice presidents will provide a smooth transition to a new president following his stepping down from that role toward the end of the academic year. He explained that he has two roles at Weber State: president and member of the tenured faculty.

Chair of the Board of Regents Dan Campbell has indicated his intent to name an interim president by May 1, which will provide a transition between May 1 and June 30. Wight is engaged in a search for another position, and many searches will wrap up in

March or April. If that search is successful, Wight will come to the Board of Trustees separately to resign his tenured faculty position. If the search is not successful, Wight has the option to stay and teach at WSU.

Committee Reports  
Business Committee

IX. Nolan Karras, filling in for Business Committee chair Scott Parson, gave the following report.

(Audit Committee Report)

1. The committee recommended approval of the Audit Committee report. Karras stated that this was the 11<sup>th</sup> time the Office of the State Auditor had a clean report for Weber State.

**ACTION**

Upon a motion from Jeff Stephens seconded by Carpenter, the Board of Trustees approved the Audit Committee report.

(Composite Financial  
Index)

2. Karras asked Norm Tarbox, vice president for Administrative Affairs, to provide a summary on the university's Composite Financial Index from FY '13 to FY '17, which provides a snapshot of the financial health of the institution through those years.

Tarbox reported that the health of the university is 5.0 for FY '17, which translates to a financial health that is significantly better than moderate strength.

**ACTION**

Upon a motion from Karras seconded by Karen Fairbanks, the Board of Trustees approved the university's Composite Financial Index Report.

Property Sale

3. The committee recommended approval of a property sale of 0.77 acres in a heavily industrialized area near Hinckley Drive and Pacific Avenue. The purchase price would be \$177,000, and proceeds would fund the Anastacio Ulibarri Scholarship Endowment.

**ACTION**

X. Upon a motion from Don Salazar seconded by

Marty Carpenter, the Board of Trustees approved the property sale.

Personnel & Academic Policy Committee

XI. Personnel & Academic Policy Committee Chair  
Karen Fairbanks gave the following report.

(PPM Changes: PPM 8-11 III-D and 10-2)

1. The committee recommended changes to PPM 8-11 III-D, Criteria for Granting Tenure, and PPM 10-2, Acceptable Use. Changes to PPM 8-11 III-D would provide standardize tenure and post-tenure processes. PPM 10-2 would bring the university's Acceptable Use Policy into the modern age in regard to privacy and other issues.

(Program Approvals)

Bret Ellis, vice president for Information Technology, thanked the team who worked on the Acceptable Use policy changes.

**ACTION**

Upon a motion from Fairbanks seconded by Karras, the Board of Trustees approved the policy changes.

(Program Proposals: BS in Mechanical Engineering, Nursing Administration Certificate, Leadership Minor)

2. Fairbanks noted a change in statute which allows Utah institutions' boards of trustees to be the final approval level for programs that are within those institutions' missions. In that context, the committee recommended that a Bachelor of Science in Mechanical Engineering, which would meet demand for the program in the local area. The committee also recommended the approval of a Post-Acute Nursing Administration Institutional Certificate of Proficiency within the Dumke College of Health Professions and a Leadership Minor within the Goddard School of Business & Economics.

**ACTION**

Upon a motion from Stephens seconded by Salazar, the Board of Trustees approved the BS in Mechanical Engineering, Post-Acute Nursing Administration Institutional Certificate of Proficiency and Leadership Minor.

(Program Name Changes)

3. The committee recommended approval of name changes for the following associate's and bachelor's degree programs:

- i. AA: Art
- ii. AS: Mathematics
- iii. AA: Chinese
- iv. AA: French
- v. AA: German
- vi. AA: Japanese
- vii. AA: Spanish
- viii. AA: American Sign Language
- ix. AAS: Product Design and Development: An Engineering Technology
- x. BS: Product Design and Development: An Engineering Technology

**ACTION**

Upon a motion from Fairbanks seconded by Carpenter, the Board of Trustees approved the aforementioned program name changes.

(Program Reviews)

The committee recommended the approval of the following program reviews:

- i. Automotive
- ii. Philosophy
- iii. Political Science
- iv. Professional Sales
- v. Social Work

**ACTION**

Upon a motion from Fairbanks seconded by Salazar, the Board of Trustees approved the aforementioned program reviews.

Sabbatical Requests

XII. The committee recommended approval of sabbatical requests for the 2018-19 academic year.

**ACTION**

Upon a motion from Fairbanks seconded by Salazar, the Board of Trustees approved sabbatical requests for the 2018-19 academic year.

Presidential Search

XIII. David Buhler, commissioner for the Utah System of Higher Education, acknowledged the work that trustees do for the university and acknowledged the

service of President Wight. He then gave details on upcoming presidential search for Weber State University, some details of which are as follows:

1. Geoff Landward, USHE assistant commissioner, would manage the search.
2. A search committee would be co-chaired by regent Jesselee Anderson and Board of Trustees Chair Nolan Karras.
3. Including the two co-chairs, four regents and four trustees will serve on the committee. Typically, the Board of Trustees members include the vice chair, the student body president and one other trustee. Regents members will include Robert “Bob” Marquardt, Cristina Ortega and Marlin Jensen.
4. The search committee was expected to be formed by the end of February. The committee would include faculty, staff, at least one student and community members. The search committee is usually comprised of 20 to 24 individuals.
5. There is no firm timeline for the search. The first search committee would be in March, with constituent meetings in Ogden and Davis County in April.
6. The search committee will finalize a position announcement. Candidates will be screened in the summer and fall.
7. With a 2/3 vote, the committee would announce finalists to the Board of Regents. Regents announce finalists publicly about 1 week prior to formal interviews, with private meetings before the interviews.
8. The Board of Trustees Executive Committee and Board of Regents will be involved in final interviews, and president will be selected following that.

		9. The decision to use a search consulting firm is up to the search committee.
Adjourn to Closed Executive Session	XIV.	Upon a motion from Karras seconded by Salazar, the Board of Trustees unanimously adjourned to a closed executive session for purposes permitted by the Utah Open Meetings Act.
Reconvene	XV.	Upon a motion from Fairbanks seconded by Karras, the Board of Trustees voted to reconvene the open meeting.
Vote on Spring 2018 Honorary Degree Recipients	XVI.	Cutrubus proposed that the trustees vote upon the following three individuals for honorary degrees in spring 2018: <ol style="list-style-type: none"> <li>1. Dixie Blackinton</li> <li>2. France Davis</li> <li>3. Jill Niederhauser Parrish</li> </ol> <p>Upon a motion from Stephens seconded by Danielle Croyle, the Board of Trustees approved honorary degrees for Blackinton, Davis and Niederhauser Parrish.</p> <p>The three recipients will be awarded with degrees during commencement on April 27, 2018.</p>
<b>ACTION</b>		
Other	XVII.	Shane Farver, secretary for the Board of Trustees, gauged trustees' interest in a retreat prior to a joint Board of Regents/Board of Trustees meeting in July 2018. He also called attention to upcoming events and reminded trustees of conflict of interest forms he had distributed in December.
Meeting Adjourned	VIII.	With no further business, the meeting adjourned.

## WSUSA Student Body President's Report

### **A. Updates on Past Events**

- a. Ravioli with Moli**
- b. Alex Sheen "Because I said I would"**
- c. Wildcat Wednesdays and Weber Wear Fridays**
- d. Neon Dance**
- e. Jam nights**

### **B. Upcoming events**

- a. Dance marathon**
- b. Elections preparation**
- c. Crystal Crest**

### **C. Utah Student Association**

- a. Mental Health**
  - i. Mental Health Video**
  - ii. Working with CPSC and Library to address this at WSU**
  - iii. Higher Ed Day**





Weber State University Alumni Association President's Report  
WSU Board of Trustees  
February 2018

➤ **Student Alumni Association**

During January the Student Alumni sent out a meaningful postcard thanking all students who have given to the Cat2Cat Scholarship (including those 217 donors who gave during Grad Finale in December 2017), totaling over 450 thank-you cards. There was a lot of excitement surrounding applications for the SAA Executive Council open for Spring 2018, and four eager and qualified applicants were interviewed and selected. Our team re-visited our goals for the remainder of 2018 and chairs were selected for two of our largest upcoming events: Leadership to Legacy and the WSUAA Golf Classic.

➤ **Young Alumni Council**

Our team grew by two members in January, and we decided on dates and chairs/co-chairs for our three upcoming GOLD ("Graduates of the Last Decade") Spring Networking events. These events will take place across the Wasatch Front in February, April and June. We elected to invite graduating students to one or all of these events, and also one great alumnus or alumna will speak at each event. Our team members committed to invite five people (or businesses/organizations) each to sponsor the WSU Alumni Golf Classic for 2018-2019 student scholarships.

➤ **WSUAA Membership**

Over the beginning of January, WSUAA members received our newly designed membership packages. The brightly colored, modern design package includes a traveling Waldo, to appear in various photos of alumni travels, and a campus map highlighting where all of the great member benefits are located, such as the Stewart Library, Stromberg Complex, athletic tickets and many more.

➤ **Grad Finale**

With over 800 graduates in attendance, December's Grad Finale was a huge success. In total, 217 graduates donated over \$4,000 to the student-funded Cat2Cat scholarship and received a green philanthropy cord to wear during convocations. Many graduates participated in a thank-you video, where they expressed gratitude for those who have supported them throughout their education. Graduates also received a WSU alumni license plate frame as a gift from the WSU Alumni Association. The Alumni Relations team hosted a *Star Wars* Facebook contest, which was advertised during Grad Finale. Contest winners received two tickets to a private screening of *The Last Jedi*. The thank-you video that was recorded during Grad Finale was played on the theater big screen before *Star Wars* began. There was a lot of excitement surrounding Grad Finale and the *Star Wars* screening.

As of January 1, 2018, total membership equals 1614 (an 8% decrease from January 2017).

General Membership = 787

Lifetime Memberships = 510

Phonathon Memberships = 302

➤ **License Plates**

As of October 2017 (FY18, First Quarter) the WSU License Plate program has generated \$7,225 — a 15% (\$250) increase from October 2016 (5 new plates, 61 renewals).



## **President's Report**

### **WSU Board of Trustees Feb. 6, 2018**

1. Weber State University Veteran Student Senator Travis Parsons has a new home in Ogden thanks to the efforts of WSU faculty and fellow students, along with Habitat for Humanity. Parsons had previously been living in a camp trailer. WSU student Solomone Tuifua designed the 1,100-square-foot home as part of associate professor Jeremy Farner's class. Farner has partnered with Habitat for Humanity for his classes in order to give students real-world experience. WSU student Rick Boman, an intern construction superintendent, oversaw volunteers and subcontractors on the site.
2. In March, WSU's Hall Global Entrepreneurship Center will host its first ever Outdoor Weber Contest, which offers the winners \$30,000 to start a business based on outdoor recreation products or services. Finalists in the contest, sponsored by Camping World®, will compete March 22-24 at Snowbasin, Wolf Creek and Power Mountain resorts. Eighty contestants submitted a 90-second video of themselves pitching outdoor-related business plans. A popular vote will determine the top 25 competitors, which will proceed to the semifinals, then a panel of industry experts will whittle the field down to 10 finalists, who will compete in the March events.
3. Weber State football finished the 2017 season with its highest end-of-season ranking ever: fifth place nationally. That capped an amazing season filled with other accomplishments. After Coach Jay Hill signed a contract extension into 2023, the Wildcats made it all the way to the semifinal round of the FCS championships and nearly bested top-ranked James Madison University. WSU now looks forward to building upon that success with Hill at the helm.
4. More than 2,715 students were honored during WSU's 150th graduation celebration on Dec. 15. The format for fall graduation changed this academic year, with no formal commencement ceremony being held, only individual colleges' convocations. Commencement speaker Greg Bell, former lieutenant governor of Utah, spoke live at two convocations. His video-recorded speech was played at the others.
5. On Feb. 10, WSU will host the Robotics State Championship, in which teams of students in kindergarten through 12th grade will battle with the robots that they've designed, programmed and built. Competitors score points by having their robots complete tasks

such as navigating around obstacles, stacking blocks or picking up debris. Nearly 1,700 people are expected to attend the event.

6. In recognition of Black History Month, Weber State University's Office of Diversity will host two film screenings and panel presentations regarding the film "The Uncomfortable Truth." Loki Mulholland, documentarian and son of Freedom Rider Joan Trumpauer Mulholland, produced the film to reveal his own family's history of owning slaves and propagating racist institutions. He, his mother Joan, and civil rights activist and Freedom Rider Luvaghn Brown will participate in the panel discussions following the film. Event times are 9 a.m. and 5:30 p.m. in the Hurst Center's Dumke Legacy Hall.
7. WSU hosted a sold-out speech from Dr. Cornel West on Jan. 16. West — a professor, public intellectual, author and activist — spoke about keeping Dr. Martin Luther King Jr.'s legacy alive through contemplation and conversation. Diversity events in January also included the annual MLK Freedom Breakfast and March, in which a breakfast at the Marshall White Center was followed by a march to the Ogden Amphitheater, and the theme was Together We Win with Love for Humanity. The Gospel Music Festival also took place in January, with The Dream Still Continues as its theme.
8. Following an amazing five years at this institution, I have announced my intention to resign from the presidency at the end of this academic year. Victoria and I have received so much kindness from the faculty, staff, students, alumni and trustees, and we are immensely grateful. While we will certainly miss the university, I am confident that the leadership that trustees and our vice presidents exhibit will carry us through a smooth transition and the selection of a new president. The mission of WSU is bigger than any one person, but I am continually impressed by the common dedication our employees show to the success of this institution — and especially our students.



# Department of Medical Laboratory Sciences Presentation: WSU Board of Trustees

*Matthew Nicholaou, DrPH, MT(ASCP)*

15



WEBER STATE UNIVERSITY  
Dumke College of Health Professions

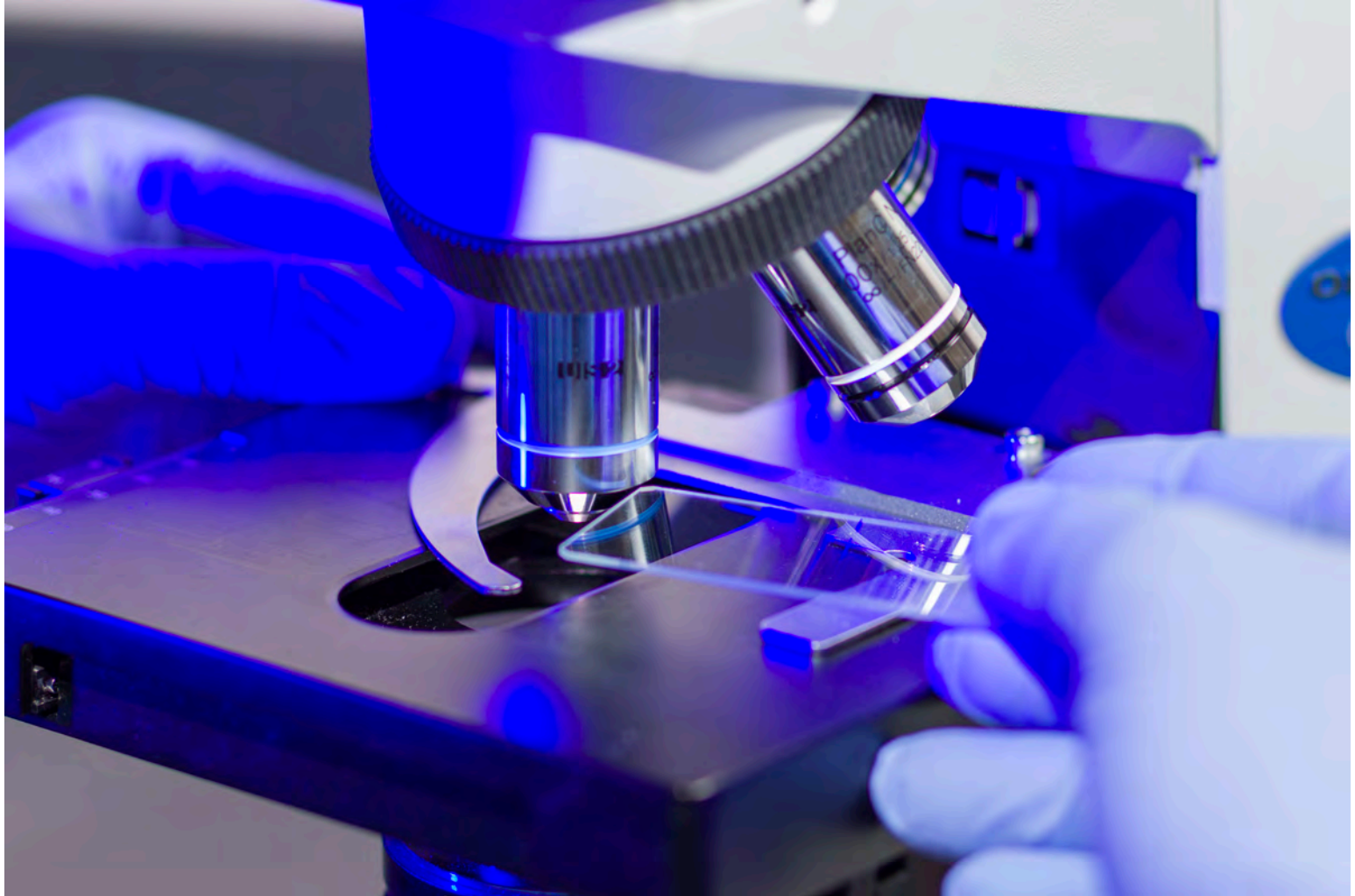
DEPARTMENT OF  
MEDICAL LABORATORY  
SCIENCES

# Outline

- Overview of the Department of Medical Laboratory Sciences (MLS)
- Highlights of Undergraduate Research in MLS
- The Future of MLS



# Overview of MLS



# Overview of MLS

- Trains Medical Laboratory Technicians (AAS) and Medical Laboratory Scientists (BS) to work in clinical diagnostic laboratories

- Hematology
- Microbiology
- Chemistry
- Immunohematology (Blood Bank)
- Immunology/Virology
- Urinalysis



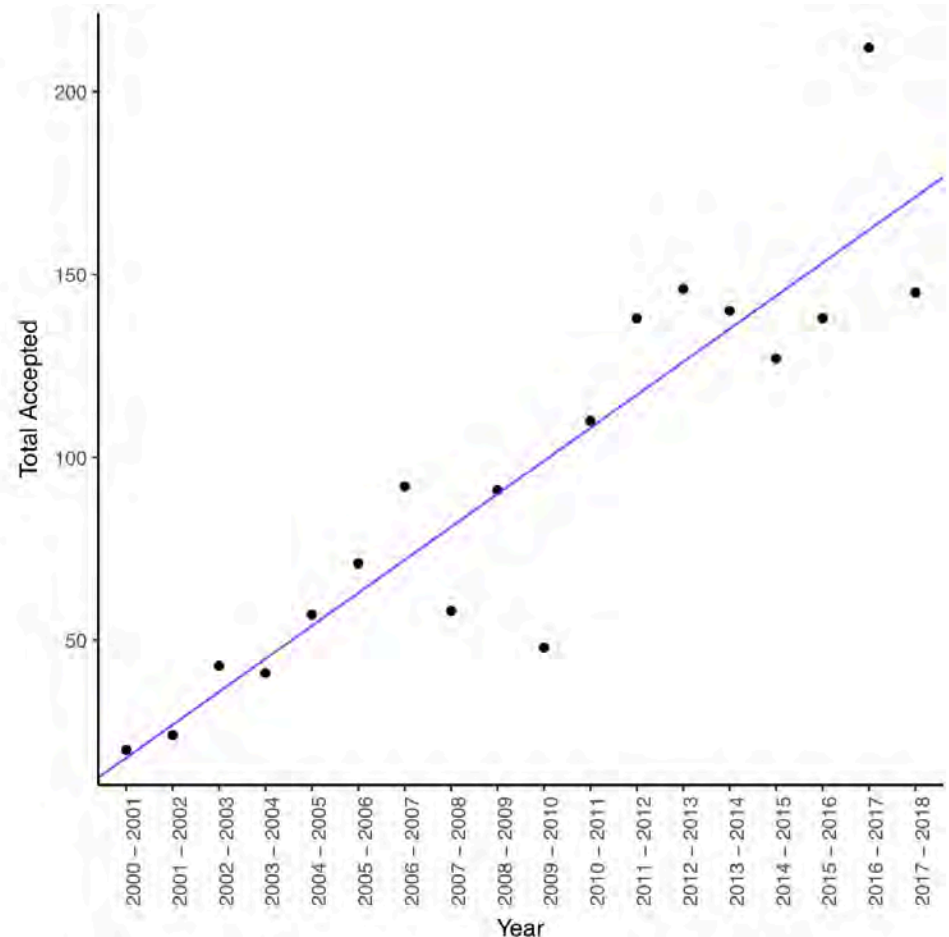
# Overview of MLS

- Currently the MLS Department offers:
  - An Associate of Applied Science and Bachelor of Science Degrees
  - Campus, Online, and Hybrid Programs
- Population
  - Campus ~30 per year and ~ 70 total
  - Online/hybrid ~ 150 per year and ~ 420 total



# Overview of MLS

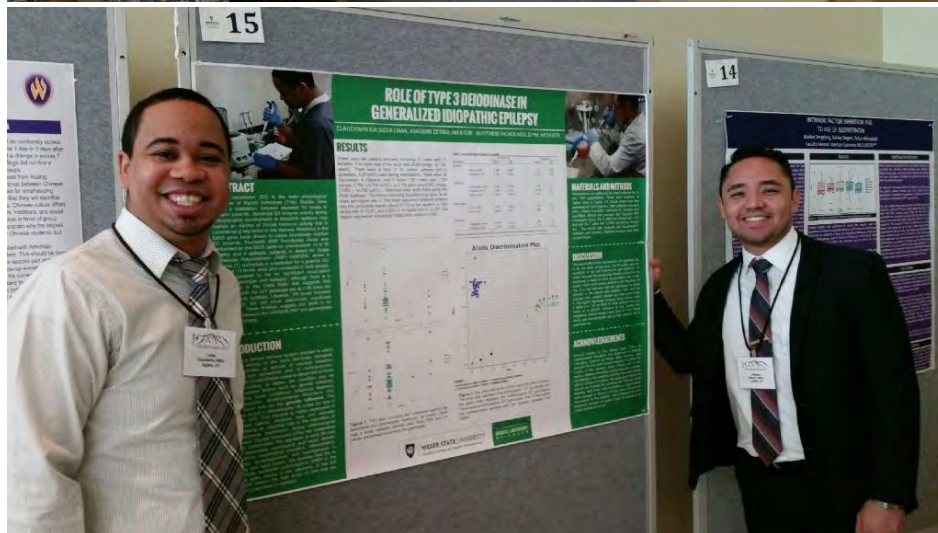
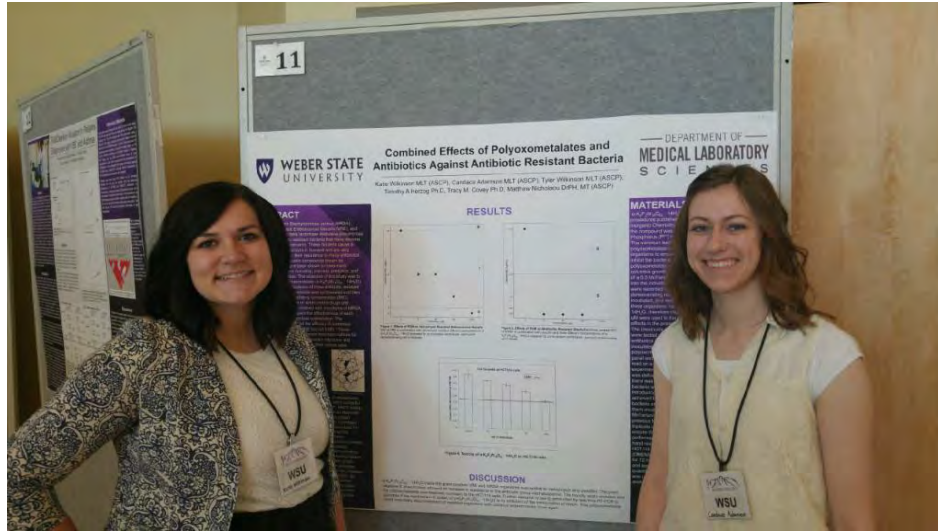
- Online Program
  - Over 420 students across 40 states
  - Largest online program at WSU and in the US for MLS
  - Rolling enrollment with tailored graduation maps for each student



# Undergraduate Research



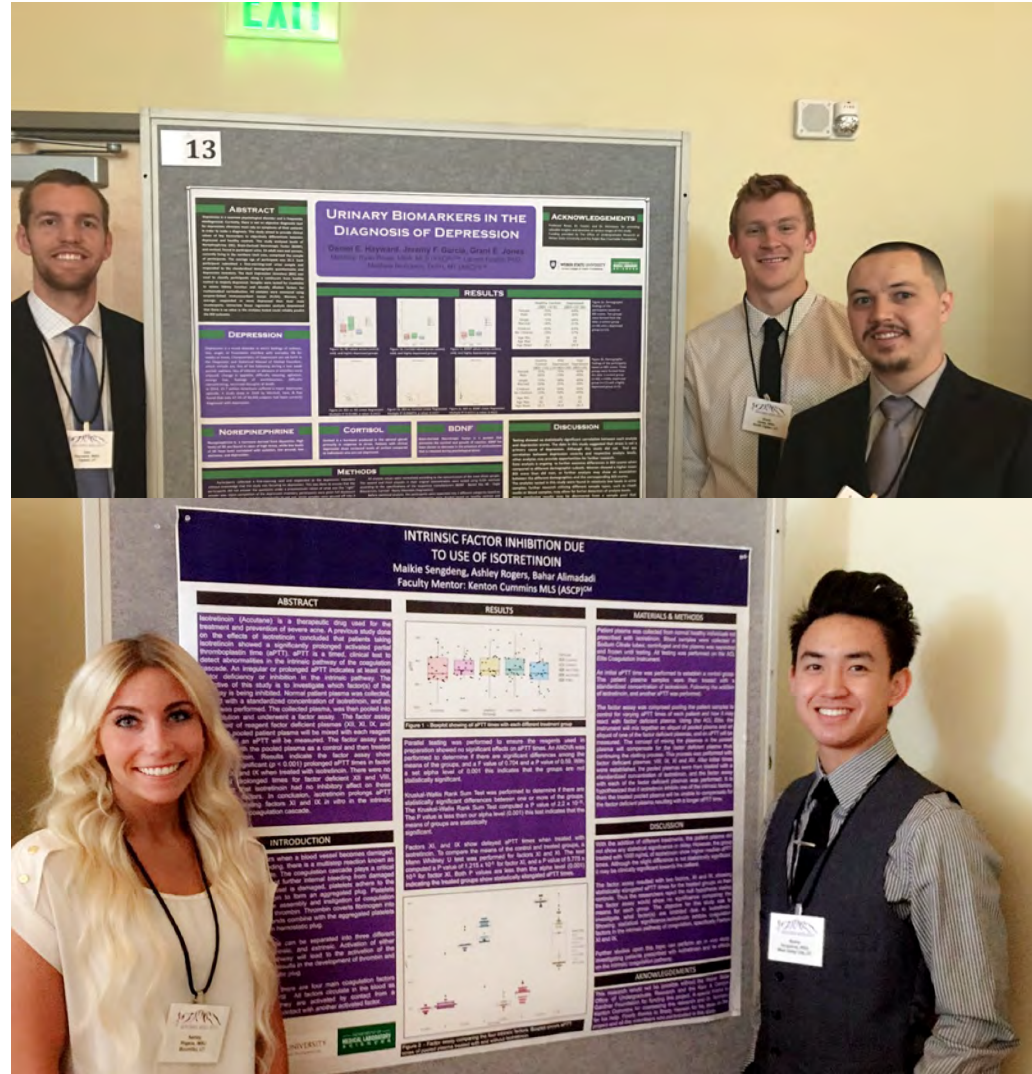
# Undergraduate Research



- ~ Half of MLS campus students are pre-Physician Assistant, Medical, or Graduate School
- These students are required to participate in a research project as part of their curriculum

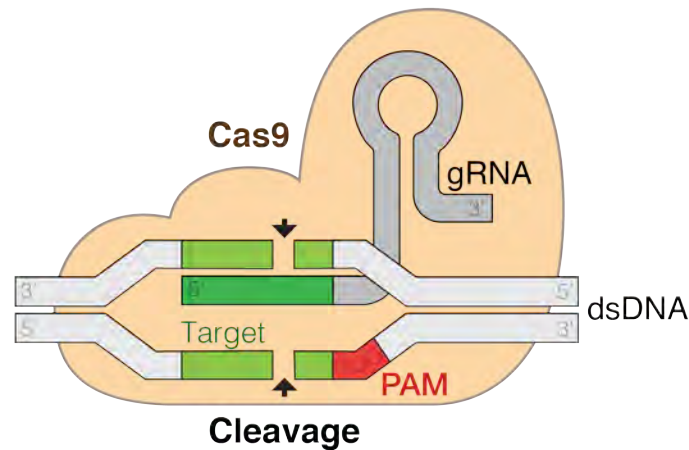
# Undergraduate Research

- Students work on their projects 1-2 yrs.
- Present at local and national conferences
- Publish in peer-reviewed journals



# Undergraduate Research

- Using Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR) to develop novel antimicrobial therapies



# Undergraduate Research

## WSU Professor Mentors High School Student Who Qualifies for International Science Competition

### Suppression of Antimicrobial Resistance in MRSA Using CRISPRs: Part II

**Question**  
Can the previously designed CRISPR-Cas9 system effectively suppress the expression of the methicillin resistance gene (mecA) in MRSA to inhibit drug resistance?

**Hypothesis**  
The CRISPR-Cas9 system successfully reduced MRSA resistance to beta-lactam antibiotics by suppressing expression of mecA.

**Methods**  
**Minimal Inhibitory Concentrations**  
MRSA was grown in serial dilutions of oxacillin. Each serial dilution was left in duplicate. Transformed bacteria were used to inoculate tubes containing 10 µg/mL, 8 µg/mL, 4 µg/mL, 2 µg/mL, 1 µg/mL, and 0.5 µg/mL of oxacillin (see Figure 2). The lowest concentration of antibiotic in which bacteria do not grow is the Minimum Inhibitory Concentration (MIC) of the bacteria. These MIC values were compared to the clinical standards to determine antibiotic resistance susceptibility.

**Bacterial Growth Challenge**  
Transformed bacteria were cultured overnight and inoculated for 3 hours in the presence of a 4 µg/mL of oxacillin to inhibit mecA gene expression. Without the oxacillin challenge, there would be little to no mecA expression and the CRISPR system would have nothing to inhibit. The oxacillin challenge and subsequent procedures were performed only on the control (pGDH) and S43 transformed bacteria, which was shown in the antibiotic assay to significantly affect antibiotic resistance.

**Total RNA Extraction**  
An RNA extraction kit was used to obtain total RNA from the bacteria after their exposure to oxacillin. Cell cultures were added to lysis buffer which lysis buffer contains lysis buffer, DNase, and RNase inhibitors. The lysis buffer was added to the culture and the cells were lysed. Each column contains a filter that captures RNA in the solution as it passes through, but that other material does not through. RNA is later released from the filter by adding an elution buffer. Lastly, DNase was added to degrade any DNA remaining in the sample.

**Reverse Transcription (cDNA Library)**  
Total RNA isolated in the previous step was used in a reverse transcriptase (RT) reaction, in which RT enzymes use RNA to produce complementary DNA (cDNA). This was done by adding gene-specific primers, dNTPs, reverse transcriptase, and distilled water to total RNA. Gene-specific primers ensure that only the desired RNA is used as a template to produce the cDNA strand. Reverse transcriptase is an enzyme that can take the RNA as a template to produce the cDNA strand. Reverse transcriptase is an enzyme that can take the RNA as a template to produce the cDNA strand. Reverse transcriptase is an enzyme that can take the RNA as a template to produce the cDNA strand.

**Real-Time PCR**  
Quantitative Real-Time Polymerase Chain Reaction (qPCR) is a method of amplifying a desired DNA sequence. qPCR differs from traditional PCR in that fluorescent dyes indicating the presence of DNA are added, allowing the real-time detection of DNA amplification. During qPCR, the single-stranded cDNA from reverse transcription is first extended into double-stranded cDNA and amplified by PCR. As each new ds-cDNA strand is formed, SYBR green molecules attach and fluorescence proportional to the amount of DNA present. Samples were subjected to qPCR to measure the cDNA template via single strands. Temperature was then heated to 55-60°C so primers could anneal to the ds-cDNA. The primers were then extended by the DNA polymerase at 72°C.

The master mix used in this study consisted of green fluorescent dye, the DNA polymerase, dNTPs, and buffer. Gene-specific primers and cDNA were added to the master mix prior to PCR performance. SYBR green molecules bound to dsDNA and fluoresced. As new dsDNA template were created during PCR, SYBR Green bound to each, increasing the overall fluorescence in the wells. This provided an indicator to the amount of cDNA present during each cycle.

15h-cDNA was used as an endogenous control. This acted as a reference because 15h-cDNA should be expressed uniformly between samples since it is essential to survival. 15h and mecA standard curves were used to easily identify the compared. Standard curves were created by successively diluting DNA and mecA RNA samples. For 15h, resulting in 1.1, 1.0, 1.000, 1.1, 0.000, and 1.1, 0.000 dilutions. Standard curves were run in triplicate and samples were subjected to amplification.

Amplification plots were created during qPCR using the overall fluorescence level present during each cycle. The fluorescence machine detects and plots the fluorescence at DNA amplified and SYBR Green molecules bound to each additional copy. After the amplification phase, the final DNA products are heated until they reach a melting point. Finally, melt curves can be used to verify the identity of any product. Multiple peaks indicate the presence of primer dimers, erroneous DNA products produced when primers bind to each other and are amplified.

**Future Steps**  
**Primer Redesign**  
Next primers will be redesigned to work more optimally under PCR conditions. This includes adjusting primers to have a unique binding site and have medium GC content.  
**Real-Time Detection**  
RNA extractions will be performed again following protocol. Loading each spin column with the correct amount of bacteria will continue to be tested, possibly ensuring more similar results between samples run in duplicate.  
**Total mecA expression**  
It is possible that neither CRISPR-Cas9 plasmid created in this experiment was fully effective because there are multiple sites that need to be blocked in order to completely suppress mecA expression. This might be achieved by transforming both S43 and S46 plasmids onto the same batch of MRSA.

**Gene Data**  
Other studies have integrated CRISPR-Cas9 systems into MRSA with bacteriophages (Bisard et al., 2014). However, this caused the researchers to call it the Cas9 system was used in this study to keep the study as simple and maintain the same gene data - a specialized genetic element designed to have a clear transferable site between organisms. The CRISPR and gene drive system could be packaged and spread into the environment through these bacteriophages. MRSA transformed with the system would not only become susceptible to beta-lactam antibiotics, but also pass the CRISPR-Cas9 system to offspring.

**CRISPRs** clustered, regularly interspaced short palindromic repeats

**methicillin-resistant staphylococcus aureus** MRSA

Clustered Regularly Interspaced Short Palindromic Repeats (CRISPRs) are genetic elements that work with an associated protein (CRISPR-associated protein, Cas) to serve as programmable immune systems. CRISPR-Cas systems have been adapted for use in biotechnology. The CRISPR-Cas9 system used in this study has been modified to target genes by blocking transcription rather than cleaving existing genes, as the traditional CRISPR-Cas9 system does.

These antibiotics are characterized by a beta-lactam ring (B1) and chemical structure. The function of targeting enzymes called penicillin-binding proteins (PBPs) which are involved in the synthesis of peptidoglycan cell walls in bacteria. Beta-lactams permanently bind with these enzymes, inhibiting further formation of the cell wall. This causes the cell wall to rupture eventually causing the cell to die.

Some strains of bacteria, such as MRSA, have acquired resistance to beta-lactam antibiotics through the mecA gene. These bacteria are capable of producing mutated PBP (beta-lactamase) enzymes that bind to the beta-lactam ring, thus allowing the PBP to continue routine construction of the cell wall, keeping the bacteria alive.

**Previous Research**

**Beta-lactam Antibiotics** e.g., methicillin, penicillin, oxacillin, cefazolin

**Results**

**Minimal Inhibitory Concentrations**  
The results for oxacillin susceptibility are <2 µg/mL to be susceptible and 2-4 µg/mL to be resistant. The MICs for the S43 plasmid and control were 4 µg/mL and 8 µg/mL, respectively. This confirmed the results of the previous years' disk diffusion tests, showing that the bacteria were not resistant to beta-lactam antibiotics, but that the S43 plasmid had caused the MRSA to become significantly less resistant. MRSA with the S43 plasmid still grew.

**Real-Time Detection**  
After performing this step, it was discovered that the incorrect amount of bacteria had been pipetted into some test tubes. Samples referred to as pGDH2 and S43-1 (not mentioned) were treated correctly, whereas samples pGDH2 and S43-2 (not mentioned) were not. In incorrect runs, almost four times more bacteria than needed were used. This resulted in the cultures being too thick, compromising their efficiency. The correctly and incorrectly treated samples contained similar amounts of RNA.

**Real-Time PCR**  
qPCR results showed that MRSA with the S43 plasmid expressed the mecA gene less than MRSA with the control plasmid, pGDH. Each sample was run in duplicate, but the two results differed. This may have been due to the inconsistent RNA concentrations obtained in a previous step.

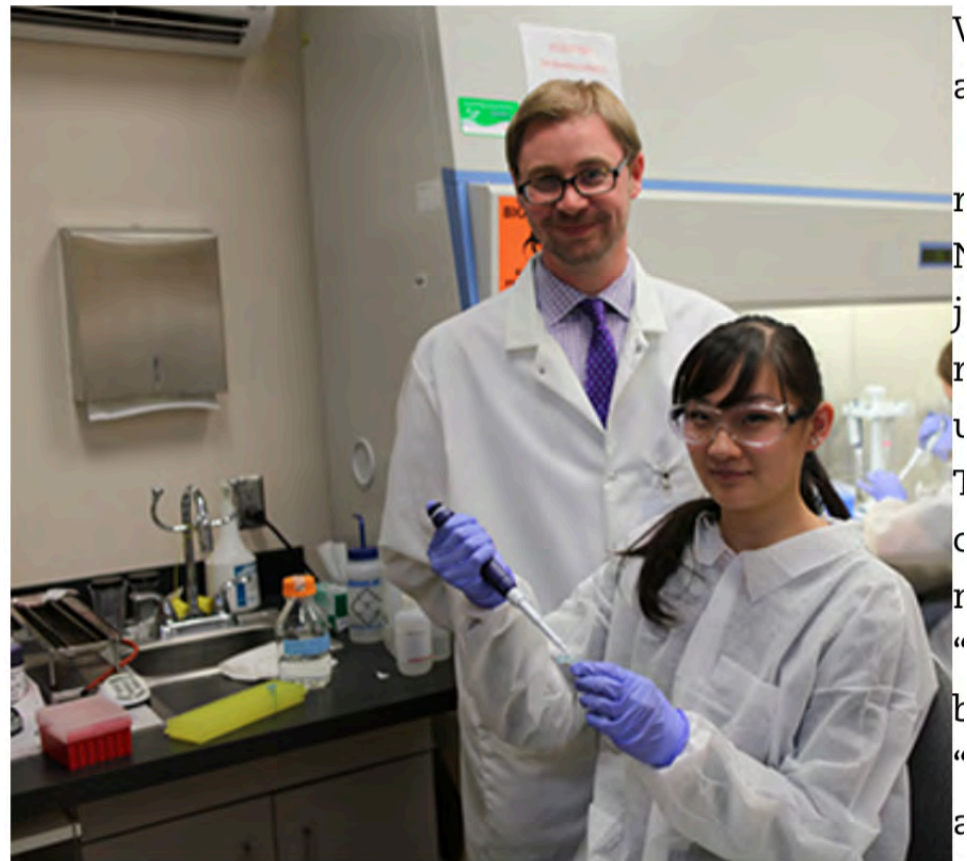
The average fold difference between pGDH and S43 was 2.41, showing that the S43 plasmid reduced mecA gene expression by more than half. The fold difference accounting for only the RNA samples handled correctly was 111.2, showing that plasmid S43 had 111.2 times less mecA expression than the control.

The standard curves for the 15h endogenous control and mecA did not both meet optimal conditions of having a slope of 3.3 and correlation coefficient of at least 0.99. For this reason, comparative quantification was used to interpret data.

The 15h melt curve had only one peak, showing that only the desired product was amplified. However, the mecA melt curve had multiple peaks, indicating that primer dimers had amplified other DNA.

**Standard Curves**  
15h-cDNA:  $R^2 = 0.997$ ,  $P < 0.0001$   
mecA:  $R^2 = 0.9847$ ,  $P < 0.0001$

**Conclusion**  
The S43 plasmid did successfully block mecA gene expression in MRSA, though not entirely. The average fold difference between the control and S43 was 2.41, and the fold difference between only correctly handled samples was 111.2. mecA primers used in the reverse transcription reaction and real-time PCR were not clean and resulted in the RNA extraction step. Accurate the primers and RNA extraction step may result in more reliable results.



# Undergraduate Research

## RESEARCH AND REPORTS

### Suppression of Antimicrobial Resistance in MRSA Using CRISPR-dCas9

KARISSA WANG, MATTHEW NICHOLAOU

#### ABSTRACT

Clustered Regularly Interspaced Short Palindromic Repeats (CRISPRs) are genetic elements that function with CRISPR-Associated (Cas) proteins as an adaptive immune system to foreign genetic material in prokaryotic

protospacer adjacent motifs, PBP 2A - penicillin binding protein 2A, RT-qPCR - reverse transcriptase quantitative real-time polymerase chain reaction, tracr - transactivating CRISPR, UDG - uracil DNA glycosylase

## CRISPR-dCAS9 Suppression of mecA Gene in MRSA

Deven Johnson MLT (ASCP), Dean Boman MLT (ASCP), Spencer Jude Kendal Beazer MHA MLS (ASCP), Matthew Nicholaou Dr.P.H. MT (ASCP)  
Weber State University, Department of Medical Laboratory Sciences  
Thanks to Ralph Nye Charitable Foundation

#### ABSTRACT

Antimicrobial therapies have seen a decrease in effectiveness as microorganisms have developed a resistance to them. Creating methods to combat pathogens is an increasing area of research, as virulent strains have become more resistant to traditional treatment methods. Through CRISPR (clustered regularly interspaced short palindromic repeats) gene editing technology, it is possible to create sequence-specific targeting mechanisms for virulence genes. The specific gene that was targeted was the *mecA* gene, which causes a strong resistance towards a wide variety of beta-lactam drugs. *Staphylococcus aureus* was targeted with a plasmid that contained a CRISPR/Cas9 system that targeted the gene sequence responsible for the beta-lactam drug resistance and repressed expression. This resulted in a 90% decrease in growth of *Staphylococcus aureus* colonies due to the increased susceptibility to beta-lactam drugs, which were previously ineffective.

The CRISPR/Cas9 plasmid also contained a resistance gene to chloramphenicol. Successful integration of the plasmid was displayed by the organism gaining a resistance to chloramphenicol, a formerly effective antimicrobial. To measure the effect of the CRISPR system, culture growth was measured and CLSI standard antimicrobial susceptibility testing was performed. This study will help open doors in further areas of research in CRISPR/Cas9 therapy as well as possible treatment options for antibiotic resistant bacteria.

#### INTRODUCTION

#### METHODS

The genome sequence for MRSA ATCC 43300 was retrieved from GenBank, at the National Center for Biotechnology Information's website. The sequence was then sent to the University of Utah HSC Cores Department where it was scanned for potential CRISPR-dCas9 binding sites. The two best sites identified were site 43 and site 46, on the coding strand and non-coding strand respectively. Plasmids were then created which included CRISPR-dCas9 systems which target sites 43 and 46. A third plasmid was created which contained a CRISPR-dCas9 that had no programmed target site. The plasmids, named S43, S46, and Pcas9, also contained a chloramphenicol resistance gene. This portion allowed the organisms to grow in agar and broth containing chloramphenicol. It also caused the plasmid to be expressed when in the presence of chloramphenicol.

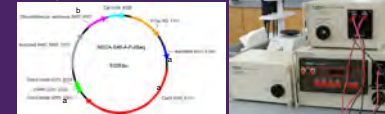


Figure 2: S46 Plasmid Design

The various portions of plasmid in color. The CRISPR-dCas9 system (a) is displayed in blue, red and green. The chloramphenicol resistance (b) is displayed in pink.

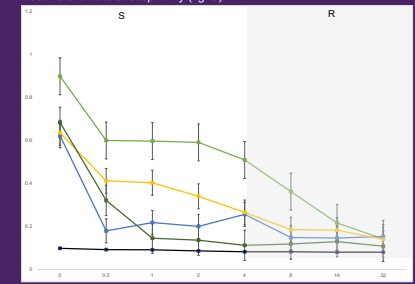


Figure 3: Gene Pulser Electroporation system used to electroporate the plasmids into the E. coli and MRSA cells.

Electroporation was the method of cell transformation used. This method involves applying an electrical current to the cell membranes, allowing DNA or other foreign objects to enter the cells. In order to ensure this

#### RESULTS

The minimum inhibitory concentration (MIC) panel for oxacillin susceptibility was read at 600 nm and the absorbance recorded for each concentration of antimicrobial. The mean absorbance at each concentration was compared to the absorbance of the control well with no antimicrobial for each cell population. CLSI susceptibility testing standards of  $\leq 2 \mu\text{g/mL}$  as susceptible and  $\geq 4 \mu\text{g/mL}$  as resistant were used to evaluate susceptibility (fig. 5).



# Undergraduate Research

- Research Recognition
  - High school project recognized by ASM at Intel ISEF and made it semifinals of national competition
  - MLS Students won 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> place Poster Prizes at the Ogden Surgical-Medical Society 72th Annual Conference



Awarded outstanding undergraduate research publication award by ASCLS



# Future of MLS

- Growth of the Online Program
  - Expand into underserved markets
  - Expansion of Hybrid program
  - Support and maintain current rate of growth
- Renovation of Campus Laboratories
- Develop expanded research program with medical school residents

# Thank you for your time!



BUSINESS COMMITTEE  
OF THE  
WEBER STATE UNIVERSITY BOARD OF TRUSTEES

A meeting of the Business Committee of the Weber State University Board of Trustees was held at 8:30 a.m., February 6, 2018, in Room 302A, President’s Office.

Members present:

Mr. Nolan Karras	Ms. Danielle Croyle	Mr. Marty Carpenter
Ms. Kearston Cutrubus		

Weber State University officials present:

Dr. Charles A. Wight	President
Dr. Norm Tarbox	Vice President for Administrative Services
Dr. Brad Mortensen	Vice President for University Advancement
Mr. Steve Nabor	Senior Associate Vice President for Financial Services & CFO
Mr. Bryce Barker	Director of Internal Audit
Mrs. Anita Preece	Secretary

Visitors: None

Excused: Mr. Scott Parson

Press: None

BUSINESS COMMITTEE MEETING

- |   |  |
|---|--|
| Minutes   | 1. The minutes of the meeting held on December 5, 2017, were approved on a motion by Mr. Karras, and a second by Ms. Cutrubus.   |
| Financial Report for the month ending December 2017 | 2. Mr. Steve Nabor, Senior Associate Vice President for Financial Services, presented the Financial Report for the month ended December 2017. With 50% of the year completed, 42.97% of the budget was expended. Mr. Nabor reported that enrollment is up 2.2%. The efforts to enhance enrollment are working. Mr. Nabor reported that collections are on target, and that WSU is financially stable.  |
| Motion  | 3. On a motion by Ms. Croyle, and a second by Ms. Cutrubus, the Financial Report for December 2017 was approved.   |
| Audit Committee Report                              | 4. Mr. Bryce Barker, Director of Internal Audit, presented the Audit Committee Report. He reported on the following: <ul style="list-style-type: none"> <li>- Mr. Barker mentioned that the State Auditor’s Office audited the university’s financial statements for the fiscal year ended June 30, 2017. It was noted that Weber State received another clean audit.</li> <li>- Mr. Barker reported on the following 3 follow-up audits <ul style="list-style-type: none"> <li>- Wildcat Store (closed)</li> <li>- Campus Wide Server (closed)</li> <li>- College of Education (left open)</li> </ul> </li> </ul> |

- Mr. Barker reported on the following scheduled audits
    - Parking Services (left open)
    - University Investments - He stated that the USHE report of Cash, Cash Equivalents, and Investments fairly presents investments as of June 30, 2017, and that investment activity for the year ended June 30, 2017, complied with applicable laws and policies.
    - Institutional Discretionary Funds - Mr. Barker reported the USHE report of Sources and Uses of Institutional Discretionary Funds was a fair representation of the university's sources and uses of discretionary funds.
  - Mr. Barker reported there were two anonymous Ethicspoint complaints received by the university since the last audit committee meeting. The complaints were reviewed and addressed by the appropriate university personnel.
- Motion 5. On a motion by Ms. Cutrubus, and a second by Ms. Croyle, the Audit Committee Report was approved.
- Financial Composite Index 6. Vice President Tarbox mentioned that this is the tenth year that the Trustees have reviewed this report. He mentioned that the report is based on our core ratio values:
  - Primary Reserve (Liquidity)
  - Net Operations Revenue (Income)
  - Viability - Expendable Net Assets/LT Debt
  - Return on Net Assets - Change in Net Assets
- Motion 7. On a motion by Mr. Carpenter, and a second by Ms. Cutrubus, the WSU Composite Financial Index was approved.
- Property Sale 8. Vice President Tarbox reported that WSU is seeking authorization to sell .77 acres of land located in the heavy industrial part of Ogden near Hinckley Drive and Pacific Avenue. The University held (and marketed) this property for more than ten years. The property sale funds a scholarship in Tony Ulibarri's name.
- Motion 9. On a motion by Ms. Croyle, and a second by Ms. Cutrubus, the Property Sale was approved.
- Monthly Investment Reports (November 2017 and December 2017) 10. Vice President Tarbox presented the Monthly Investment Reports for the months of November and December 2017. He reported that WSU is in compliance with the Board of Regents Policy, and the State Money Management Act.

Minutes, February 6, 2018  
Business Committee  
WSU Board of Trustees

Motion

11. On a motion by Mr. Carpenter, and a second by Ms. Croyle, the Monthly Investment Reports for November and December 2017 were approved.

Legislative Update

12. Dr. Brad Mortensen, Vice President for University Advancement, gave a brief update on the legislative session.

Adjournment

13. The meeting adjourned at 9:15 a.m.

**Board of Trustees  
Personnel and Academic Policy Committee  
February 6, 2018**

**Members present: Karen Fairbanks, Don Salaza, Aulola Moli, Karla Bergeson, Jeff Stephens,  
Madonne Miner**

**Guests:**

1. Personnel Changes were presented to the committee.
2. The following Early Retirement Request was approved on a motion by Jeff Stephens seconded by Don Salazar:  
  
    Sherrie Ann Jensen, Health Promotion and Human Performance, Start Date 03/30/1998
3. The following Program Reviews were recommended to the full board by Don Salazar seconded by Aulola Moli:  
    Automotive  
    Philosophy  
    Political Science  
    Professional Sales  
    Social Work
4. The following Program Name Changes were recommended to the full board by Jeff Stephens seconded by Don Salazar:  
    Art  
    Mathematics  
    Chinese  
    French  
    German  
    Japanese  
    Spanish  
    American Sign Language  
    AAS: Production Design and Development  
    BS: Product Design and Development
5. The following Program Proposals were recommended to the full board by Don Salazar seconded by Aulola Moli:  
    BS in Mechanical Engineering  
    Nursing Administration Certificate  
    Leadership Minor
6. Sabbatical Leave requests were recommended to the full board on a motion by Jeff Stephens seconded by Don Salazar.
7. PPM 8-11 III-D: Criterial for Granting Tenure was recommended to the full board by Aulola Moli, seconded by Don Salazar.
8. PPM 10-2: Acceptable Use was recommended to the full board by Karen Fairbanks, seconded by Don Salazar.