

2nd Annual Mechanical Engineering Newsletter, Spring 2019

ME Alumni,

Greetings from the ME Department. Our department is doing well. Our current undergraduate enrollment sits at 691, and MSME enrollment is 145. We had approximately 1700 applications for Fall 2019 for our undergraduate program, so interest definitely is high. Check out some of our news below, and if you're in downtown San Jose, stop by to see us! Nicole Okamoto, Chair

Alumni event planned!

Come back to SJSU on May 9 between 6:00 and 8:30 pm. We'll have hors d'oeuvres and drinks, and 2019 senior design students will be showing off their prototypes. Please RSVP at <https://forms.gle/DUjSsZLWPuUmhEtF6> so we can plan for how much food to order. Non-alumni guests are also welcome. Most full time ME faculty will be there. The event will be held in the SJSU Student Union Rooms 1a/1b, right next to the Engineering Building. We'd love to catch up with you!

Focus on new faculty



Dr. Crystal M. Han

Education: BS from Korea Advanced Institute of Science and Technology (KAIST), MSME and Ph.D. from Stanford University

Date Joined SJSU: January 2018

Courses Taught: ME111 Fluid Mechanics, ME114 Heat Transfer

Research: Dr. Han's primary research interest is development of microfluidic techniques to address challenging needs in global health. Her research group leverages control of transport and reaction of biomolecules by electric field to develop microfluidic techniques applicable to rapid point-of-care disease diagnosis, food safety, and biomolecular research. Currently, she is working on several projects including size-selective purification of RNA for small input ribosome profiling, sensitive protein detection by ITP-accelerated binding reaction, and continuous monitoring of waterborne bacteria. Her multidisciplinary research involves collaboration with several scholars within and outside SJSU including Dr. Rosenfeld in Chemical Engineering Dept., Dr. Palko at UC Merced, and Dr. Cenik at U of Texas at Austin.

What she likes about SJSU: Students passionate about learning, curriculum with an emphasis on hands-on experience, supportive research atmosphere among colleagues.



Dr. Amir Armani

Education: BS and MS: Sharif University of Technology, PhD: Missouri University of Science and Technology

Date Joined SJSU: August 2018

Courses Taught: ME 154 – Mechanical Engineering Design, ME 273 – Finite Element Methods in Engineering

Research: Dr. Armani's research has been centered on design and optimization, additive manufacturing, structural ceramics, functionally graded materials, and sheet metal forming. He is the author/co-author of one book, one US patent, and thirty peer-reviewed articles (14 journal papers and 16 conference papers). Since joining SJSU, he has been establishing a 3D Printing lab to conduct research on additive manufacturing of various materials, ranging from polymers to ceramics; exploring methods of increasing productivity of additive manufacturing processes; and optimal design of parts for additive manufacturing. He is also interested in collaborating with local industry (currently working with MolyWorks Materials Corporation on additive manufacturing of superalloys).

What he likes about SJSU: friendly and enthusiastic students, congenial and supportive colleagues, and diversity.



Dr. Feruza Amirkulova

Education: BS, MS, and PhD Samarkand State University (Samarkand, Uzbekistan), MS and Ph.D. from Rutgers University (New Brunswick NJ USA)

Date Joined SJSU: August 2018

Courses Taught: ME 147 (Dynamic Systems Vibration and Control) and ME 243 (Vibration of Mechanical Systems)

Research: Dr. Amirkulova's research is focused on computational modeling and simulation of acoustic and elastic *metamaterials* that exhibit extraordinary wave bearing properties, vibration, wave and propagation in structures and mechanical systems including multiple scattering effects, anisotropy and heterogeneity. She is currently working on inverse design of complex metamaterials (super lenses, cloaks, absorbers, diffusers) using advanced optimization methods and machine learning techniques. She also studies acoustic scattering by Willis-coupled *bi-anisotropic* fluid cylinders; *Willis* coupling vector relates the pressure and momentum density to the volume strain and particle velocity simultaneously. Dr. Amirkulova is an active member of the ASA, ASME, SPIE, AAUW, SWE and a member of several technical committees at ASME and ASA. She is a referee of 6 journals. Dr. Amirkulova organized/organizing several special sessions at international and regional conferences including ASA Fall 2018, ASA Fall 2019, SV WiE 2019. Since joining SJSU, Dr. Amirkulova was awarded University Grant Academy award and currently working on her NSF proposal, and directing a group of three students (two undergraduate and one graduate) to design a metamaterial structures using advanced optimization and machine learning techniques including neural networks and SVM.

What she likes about SJSU: Diverse community, very enthusiastic and motivated students, and supportive and friendly colleagues

SJSU ME Senior Design Project and San Jose Independence High School “Near-Peer:” Mentoring Program

By Prof. James Mokri

Two SJSU ME Senior Project teams are involved with Independence High School (IHS) in San Jose in a “Near-Peer” mentoring program connecting high school students with university mechanical engineering seniors. This is the 4th year of this collaboration which focuses on automotive technology and has mutually benefited the mentors and mentees resulting in multiple high school students applying to schools of higher education and several that specifically have enrolled at SJSU.

This program assists with the challenge of preparing high school and university students for local high-skill careers in the automotive technology field. Future vehicles will fit the ACES acronym of Autonomous, Connected, Electric, and Shared, all a part of a new smart transportation system. IHS student David Chau had a love affair with cars, so when he enrolled at Independence High School on San Jose’s East Side, he went straight to teacher Sorin Neagu’s highly-regarded automotive technology classes. In addition to learning about engine components and brakes, David participated in a “Near-Peer” mentoring program where students from Neagu’s class worked with SJSU ME students completing their senior capstone projects. Through the design, build and test activities, and brief classroom lectures, the SJSU students mentored IHS students on strength of materials, machine design, mechatronics, and electrical systems. David is now a sophomore at San Jose State.

This year, the student teams have partnered with the Santa Clara Valley Transportation Authority (VTA) to address two labor intensive bus maintenance issues applicable to more than 200 transit buses. The mentees are helping with the material fabrication, assembly and testing in the IHS shop which relieves the limited Senior Project Lab space at SJSU.

The STEM career pathways for high school students and the SJSU Senior Design project are helping to build a sustainable channel of locally-sourced Silicon Valley talent to fuel the region’s growth in the advanced transportation sector.



Senior Project Team



IHS and SJSU Students

Spartan Superway Spring 2019 Update

By Prof. Buff Furman

Some of you are familiar with SJSU’s Spartan Superway project that focusses on developing a sustainable, convenient elevated transport system for urban environments.

The Spartan Superway project continues in its seventh year of operation. Notable developments include changing the location of the Spartan Superway Design Center, achievements by graduate students and undergraduate student teams, and changes in the focus of Superway’s method of operating.

The project had to relocate from 128 E. St. John St., where it had been since 2014, to a new facility, located at 115 Terraine St., because of a change of ownership of the former building. This forced a mad scramble in December and January to clear out four-plus years of models and equipment. The project is now in a building that was a former courthouse, which makes for a more pleasant environment compared to the ‘garage’, but the

physical layout has made it more challenging to do the kind of fabrication and model building that we have been accustomed to.

There are 32 students organized into 11 subteams this year working on various aspects of a revised full-scale, half-scale, and small scale functional models. The teams are hoping to show their work at the 2019 Maker Faire Bay Area in May.



The teams are also now working under non-disclosure agreement with external partners who are in the process of commercializing this revolutionary form of truly sustainable urban transportation.

In Other News

Chandrakant Patel, SJSU MSME alum and Hewlett Packard Senior Fellow and Chief Engineer, has been elected to the National Academy of Engineering. This is one of the highest professional honors awarded to an engineer.

Mark Pasquale, VP and General Manager of Special Programs at Lockheed Martin Space, was elected to the Silicon Valley Engineering Council Hall of Fame. Only two people per year are elected. Mr. Pasquale is a 1984 BSME alum and member of our Department Advisory Council.

Xuwen Mao, Atharv Datye, Shivam Singh, Vincent Souza each had a paper accepted for the 2019 National Conference on Undergraduate Research. Only about 10% of submissions were accepted. All are advised by SJSU ME Prof. **Dr. Sohail Zaidi**. Dr. Zaidi also has a poster presentation at the 10th Annual Bay Area Biomedical Device Conference and a paper accepted at the Thermal Management Conference in Colorado this summer with SJSU student **Eric Chu**.

Harsimran Singh, SJSU alumni advised by **Dr. Vimal Viswanathan**, presenting his paper titled "Modeling Customer Requirements from User Reviews: A Neural Network Approach," at ASME International Design Engineering Technical Conferences (IDETC) - Design Theory and Methodology (DTM) conference. DTM has an acceptance rate of less than 20%.

Five SJSU ME students will be presenting papers at ASME's IMECE conference – **Mustafa Ihsan** and **Joseph Dei Rosi**, advised by **Dr. Viswanathan**, and **Fang Ming Lin, Kshitiz Khanna**, and **Nathan Millard**, advised by **Dr. Raymond Yee**. Fang Ming Lin's thesis was supported by the Lawrence Berkeley National Laboratory, and she presented her thesis results to the European Scientific Community in the summer of 2018. She also won the CoE Davidson Student Scholar award of \$3000 based on her thesis work.

SJSU students took home four awards at the ASME student competition in Pomona California in March. **Menson Li** and **Grant Quan** took 1st and 2nd place in the Old-Guard Technical Poster Competition, and **Jared Lugo** and **Neeraj Lal** took 3rd and 4th in the Old-Guard Oral Presentation Competition. Congrats to the students and to ASME advisor **Dr. Winney Du**.



Dr. John Lee, in collaboration with Dr. Anand Ramasubramanian from Chemical Engineering, is conducting research on micromechanics of blood clots. The investigation is sponsored by a \$154k grant from the American Heart Association. MSME students **Sue-Mae Saw** and **Curtis Young** are each presenting their respective research results at the ASME/JSME/KSME Joint Fluids Engineering Meeting in Summer 2019.

ME Professor **Dr. Vimal Viswanathan** has been awarded an Improving Undergraduate STEM Education (IUSE) grant by NSF. This is a collaborative grant led by Texas A&M University's Sketch Recognition lab and aims at developing and implementing a web-based, interactive, virtual tutor for training undergraduate students in the creation of free-body diagrams. Dr. Viswanathan is the PI for this project at SJSU, and he will collaborate with four other schools.

Dr. Fred Barez from ME along with Dr. Freund from Industrial and Systems Engineering and Dr. Schultz-Krohn from Occupational Therapy were awarded a grant from Toyota Boshoku entitled "Autonomous Vehicle (AV) and Mobility-as-a-Service (Maas)" worth close to \$200k.

The ME Department at SJSU now offers Solidworks certification through two classes – ME 165, our senior-level CAD elective, includes Certified SOLIDWORKS Associate exams, and we are offering advanced instruction and Certified SOLIDWORKS Professional exams via ME 180. Enrollment in these courses this semester sits at 124 and 19, respectively. They are taught by **Dr. Susan Bowley**.

For the first time this semester, we are teaching a new course ME 268 3D Printing and Additive Manufacturing. The instructor is **Dr. Peter Woytowicz**.

Our MSME program held on-site at Lockheed Martin has 22 students finishing up their MS projects, and most will graduate in May. We hope to offer a new cohort starting in the fall. The program is advised by **Dr. Nicole Okamoto**, and the MS projects are jointly advised by **Drs. Du and Okamoto**.

Ms. Lydie Jones is our new department administrative analyst. If you contact the department, she may be the first person with whom you interact. Many of you have heard that our former department admin, **Lilly Wilderman**, passed away last summer after years of dedicated service to our department and college. We miss her dearly.