

# STEM Webinar Sessions

## June Sessions

June 15th, 2020

2020  
BOBCAT SUMMER STEM  
ACADEMY  
VIRTUAL EDITION



### ***Presenter: Alyson Caine***

#### **Insights from Beyond the Grave**

This session will go over the insights bioarchaeologists can gain from studying the burial practices and skeletons of people from the past. Specific methods of analysis as well as various theories for interpretation will be discussed.

#### **About the Presenter:**

Alyson Caine has her Master's in Paleopathology, study of disease in the past, and is a PhD Candidate in the Interdisciplinary Humanities Graduate Group at UC Merced. She studies social inequality in ancient Egypt and tries to understand how inequalities impacted the daily lives of people living in Egypt during the Middle and New Kingdom Periods.

#### **Who is the webinar session open to?**

**K-5 (Elementary school), Grades 6th-8th (Middle School), Grades 9th-12th (High School), Teacher, Community members, Undergrads**

#### **When is the session:**

- **June 15th: 2pm to 3pm**

#### **How can you register?**

#### **Zoom Registration Link Below:**

**<https://ucmerced.zoom.us/meeting/register/tjwrdu6vpjorG9ePstopXStApAXmDc7JsLan>**

# STEM Webinar Sessions

## July Sessions

July 7th, 2020

2020  
BOBCAT SUMMER STEM  
ACADEMY  
VIRTUAL EDITION



### ***Presenter: Jeanette Cobian***

#### **The science behind wildfires!**

The goal of this session is to provide an overview of the science behind wildfires and to provide a behind the scenes look at the work of scientists to study wildfire.

### **About the Presenter:**

Jeanette Cobian-Iñiguez studies the science behind wildfires. She works in a laboratory where she does experiments to understand how wildfires behave. Jeanette also uses wildfire information from satellites that view earth from space and teach us about the workings of our planet.

### **Who is the webinar session open to?**

- **K-8 students**

### **When is the session:**

- **July 7th: 2pm to 3pm**

### **How can you register?**

#### **Zoom Registration Link Below:**

<https://ucmerced.zoom.us/meeting/register/tJMldO2vrzgiGdYP8u7xQHpHIVtogHyRzTJI>

# STEM Webinar Sessions

## July Sessions

July 8th, 2020

2020  
BOBCAT SUMMER STEM  
ACADEMY  
VIRTUAL EDITION



### ***Presenter: Karen Smith***

### **Using science to protect lab workers and the community**

Research can be dangerous both to laboratory workers and the surrounding community. In this session we will discuss how we protect workers and the community through risk management, engineering, rules, and protective equipment. Why do we wear protective equipment? Why don't we wear the same items all the time, and how we know when it is needed?



### **About the Presenter:**

Karen Smith holds a Master's degree in Occupational Health and Environmental Management, and a Bachelor's degree in Chemistry and Biochemistry. She has worked at UC Merced for nine years in Environmental Health and Safety as the Chemical Hygiene Officer, Radiation Safety Officer, Industrial Hygienist, Laboratory Safety Program Manager, and Chemical Waste Program Manager. Karen is also a Certified Industrial Hygienist, Certified Safety Professional, Associate Risk Manager, and Certified Scientific Materials Manager.

### **Who is the webinar session open to?**

- **K-12 students, Teacher, Community members, Undergraduates**

### **When is the session:**

- **July 8th: 3pm to 4pm**

### **How can you register?**

#### **Zoom Registration Link Below:**

**<https://ucmerced.zoom.us/meeting/register/tJMrcuugrzsoHtw5gFjI9JbJ0IHAQMKAOXsG>**

# STEM Webinar Sessions

## July Sessions

July 10th, 2020

2020  
BOBCAT SUMMER STEM  
ACADEMY  
VIRTUAL EDITION



### ***Presenter: Alejandra Santoyo***

#### **Sounds in the Brain: The anatomy of the human ear and current research on how the brain perceives sound**

Do you wonder how the brain knows where a sound is coming from? Do you ever marvel at how your brain knows what sounds are music and which are language? I will be explaining the anatomy of the human ear and how it functions to turn sound waves in the air into interpretable signals for your brain. I will also cover current research in the field of auditory science so don't miss out!

### **About the Presenter:**

My name is Alex, (short for Alejandra) and I am a first-year graduate student in the Department of Cognitive and Information Sciences at the University of California, Merced. As an undergraduate at the UC, I was a part of two summer research internships, a volunteer in several research labs, and worked as an assistant in the Office of Housing and Residence Life and the Office of Undergraduate Research. In my free time I like to take pictures, design and mold clay earrings, cook weird recipes that are so spicy my nose starts to sweat, go on hikes, and listen to all kinds of music!

### **Who is the webinar session open to?**

- **K-12 students- Middle and High School Students**

### **When is the session:**

- **July 10th: 10am to 11am**

### **How can you register?**

#### **Zoom Registration Link Below:**

**<https://ucmerced.zoom.us/meeting/register/tJYuce-vqDkqHtbLPQZgkSeUVCdgMPRIpAfD>**

# STEM Webinar Sessions

## July Sessions

July 13th, 2020

2020  
BOBCAT SUMMER STEM  
ACADEMY  
VIRTUAL EDITION



### ***Presenter: Dr. Mehmet Baykara***

### **Exploring the Nano-world with Atomic Force Microscopy**

This session will give an overview of the exciting field of nanotechnology and the Nobel-prize-winning invention of Atomic Force Microscopy.

### **About the Presenter:**

Dr. Mehmet Z. Baykara obtained his PhD degree from Yale University in 2012. Between 2012 and 2017, he worked as an Assistant Professor at Bilkent University, where he conducted research funded by the European Commission. After a 3-month stay at Harvard University as Visiting Scholar, Mehmet started at the University of California, Merced as an Assistant Professor of Mechanical Engineering in January 2018. His work focuses on nanomechanics, nanotribology and scanning probe microscopy.

### **Who is the webinar session open to?**

- **Grades 9th-12th (High School), Teacher, Undergraduates**

### **When is the session:**

- **July 13th: 9am to 10am**

### **How can you register?**

### **Zoom Registration Link Below:**

<https://ucmerced.zoom.us/meeting/register/tjYtde-srTsqEtAk2pzbO4wKTFjnQIt40528>

# STEM Webinar Sessions

## July Sessions

July 17th, 2020

2020  
BOBCAT SUMMER STEM  
ACADEMY  
VIRTUAL EDITION



***Presenter: Jimmy Gonzalez Nunez***

### **Introduction to Modeling Biological Systems**

Have you ever thought about all that goes into learning how to code? Thinking about how and where to start can be so frightening, so debilitating that it deters us from learning how to communicate with computers in order to solve complex problems. In this session, we adventure through fundamental principles in programming by exploring modeling approaches used in biological systems, such as the spread of an infectious disease in a community. We shall start from general observations and construct simple models that can be implemented in Python and Jupyter notebooks. From here, we use this virtual playground to examine what information about the biological system can be drawn from these models.

### **About the Presenter:**

Jimmy is a 2nd year Physics graduate student at UC Merced, and is currently studying population genetics in bacterial colonies using computational physics methodologies. While his focus is on researching fundamental principles in physical systems, he enjoys taking time to explore his passion of contributing to the education of young minds and inspiring tomorrow's researchers.

### **Who is the webinar session open to?**

**Grades 9th-12th (High School), Teacher, Community members, Undergrads**

### **When is the session:**

- **July 17th: 10am to 11am**

### **How can you register?**

### **Zoom Registration Link Below:**

**<https://ucmerced.zoom.us/meeting/register/tJMpfuyhrDlpGtzV94iNiYVQNht0hzHd3WxW>**

# STEM Webinar Sessions

## July Sessions

July 21st, 2020

2020  
BOBCAT SUMMER STEM  
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### ***Presenter: Dr. David Ardell***

#### **Blood and Malaria: Natural Selection in humans**

This session will feature an interactive activity using cards and dice to illustrate natural selection and its role in increasing the frequency of the sickle-cell allele in malaria-afflicted human populations.

### **About the Presenter:**

Dr. David Ardell earned a Ph.D. in ecology and evolutionary biology from Stanford in 2000, and became an Associate Research Professor of Bioinformatics in Uppsala Sweden before joining the faculty of UC Merced in 2008, where he became an Associate Professor of Molecular and Cellular Biology in 2017.

### **Who is the webinar session open to?**

- **Grades 6th-8th (Middle School), Grades 9th-12th (High School), Teachers**

### **When is the session:**

- **July 21st: 1pm to 2pm**

### **How can you register?**

#### **Zoom Registration Link Below:**

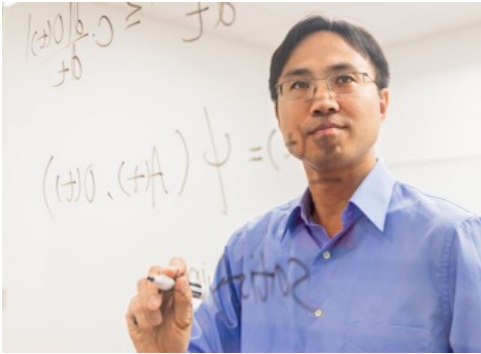
**<https://ucmerced.zoom.us/meeting/register/tJMqcOCqzozsHty69or8uMfT456X6fYGxcjf>**

# STEM Webinar Sessions

## July Sessions

July 23rd, 2020

2020  
BOBCAT SUMMER STEM  
ACADEMY  
VIRTUAL EDITION



### **Presenter: Sungjin Im**

#### **Algorithmically speaking: how to hire the best employee**

Suppose you want to hire the best employee from a pool of candidates. The challenge is that you have to hire or reject a candidate right after interviewing him or her, and the decision is final. The history of this question dates back to Kepler, a famous astronomer. In this session, we will cover the history of the problem, the algorithmics behind it, and its new applications in the modern era. Only basic probability knowledge is needed to follow the session.

### **About the Presenter:**

Sungjin Im is an assistant professor in the department of Computer Science and Engineering at UC Merced. He works on design and analysis of algorithms, focusing on how to nearly optimally solve problems under uncertainties. He has received a National Science Foundation CAREER award.

### **Who is the webinar session open to?**

- **Grades 9th-12th (High School), Teachers, Community Members**

### **When is the session:**

- **July 23rd: 3pm to 4pm**

### **How can you register?**

#### **Zoom Registration Link Below:**

[https://ucmerced.zoom.us/meeting/register/tJUqc-GqrDosHdz1Mej39cCox2rykbE\\_uun3](https://ucmerced.zoom.us/meeting/register/tJUqc-GqrDosHdz1Mej39cCox2rykbE_uun3)



# STEM Webinar Sessions

## July Sessions

July 27th, 2020

2020  
BOBCAT SUMMER STEM  
ACADEMY  
VIRTUAL EDITION



### **Presenter: Miaomiao Liu**

#### **Video object detection based on artificial intelligence techniques**

Continuous and real-time object detection in video is essential for many mobile applications, like traffic monitoring and augmented reality (AR). For example, real-time warnings can be sent to road users automatically by a camera installed on top of a highway road if any reckless driving maneuvers are detected. AR-based videos are promising in many applications, such as tourism, navigation and entertainment, which require to detect and track objects in videos on mobile devices continuously and in real time. Deep learning and computer vision techniques have shown superior performance in object detection. I will introduce how these artificial intelligences can be leveraged in video processing systems.

### **About the Presenter:**

Miaomiao is a second-year computer science PhD student at University of California, Merced. Her research interests lie in the areas of system and networking, computer vision, machine learning and internet of things. She also serve as the teaching assistant at computer science and engineering department.

### **Who is the webinar session open to?**

**K-5 (Elementary school), Grades 6th-8th (Middle School), Grades 9th-12th (High School), Teacher, Community members, Undergrads**

### **When is the session:**

- **July 27th: 3pm to 4pm**

### **How can you register?**

#### **Zoom Registration Link Below:**

**[https://ucmerced.zoom.us/meeting/register/tJUpdO2gqz8qE9QpLFhS\\_aZIWK\\_NgUQXkIka](https://ucmerced.zoom.us/meeting/register/tJUpdO2gqz8qE9QpLFhS_aZIWK_NgUQXkIka)**

# STEM Webinar Sessions

## July Sessions

July 15th, 2020

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### **Presenter:**

**Dr. Dustin Kleckner**

### **Knots in Fluids (and other places you wouldn't expect them)**

Knots are a familiar part of everyday life, but you might be surprised to learn they are also an active area of research in mathematics. Remarkably, knots have also found their way into physics, where they have shown up in a variety of surprising places like fluid dynamics. Scientists often describe fluid flows in terms of 'vortex lines', which are essentially just straight or curved lines around which a fluid spins: examples include tornadoes and smoke rings.

Starting in 2010, Dr. Kleckner conducted a series of experiments to answer a question first posed 150 years ago: if you tie a vortex into a knot, does it stay knotted like a piece of string would? The answer is... complicated. In this talk, he will give an overview of how scientists and mathematicians think about knots. He will also talk about what took to create vortex knots in real experiments, and about potential connections to the behavior of DNA and solar flares on the surface of the sun.

### **About the Presenter:**

Dustin Kleckner is an experimental physicist who has worked in a variety of areas from quantum optics to soft condensed matter physics. He obtained his PhD from UC Santa Barbara in 2010, after which he did postdoctoral research at the University of Chicago and then joined the faculty in Physics at UC Merced in 2015. His research deals with a variety of problems in soft matter physics and fluid dynamics.

**Website:** <https://faculty.ucmerced.edu/dkleckner>

### **Who is the webinar session open to?**

**Grades 9th-12th (High School), Teacher, Community members, Undergrads**

### **When is the session:**

- **July 15th: 3pm to 4pm**

### **How can you register?**

### **Zoom Registration Link Below:**

<https://ucmerced.zoom.us/meeting/register/tJAqc-yvqjstG9DsE58Cal2dq30aTydgX3ls>