Section 001: Introduction to Materials Research using a Scanning Electron Microscope (Natural Science)
Dr. Carl Boehlert & Dr. Per Askeland, Department of Chemical Engineering & Materials Science
Fri. 3-3:50pm; Max 16
Introduction to Materials Research through Scanning Electron Microscopy: This Research Seminar will allow students to learn about one of the most widely used tools in multidisciplinary materials-based research, a scanning electron microscope (SEM). Students will focus on SEM analysis of ceramics, composites, biomaterials, metallic alloys, etc. The students will also be responsible for performing a materials-based research project using the SEM and presenting their research through a poster display at the University Undergraduate Research and Arts Forum (UURAF) in April 2022.

Section 002: From Atomic Nuclei to Stars: Research at the National Superconducting Cyclotron Laboratory (Natural Science)
Dr. Georg Bollen & Colleagues, NSCL/FRIB and Department of Physics and Astronomy
Thurs. 5-5:50pm; Max 10
For more than 50 years, scientists from MSU and all over the world have been conducting nuclear physics research at the National Superconducting Cyclotron (NSCL), producing and studying the properties of exotic nuclei, discovering new phenomena and creating new theoretical models to explain and predict nuclear characteristics. The same exotic nuclei are also participating in stellar events, defining the energetics of supernova explosions and guiding the synthesis of the elements we see around us. In this Honors Research Seminar students will learn about some of the exciting research projects that faculty at NSCL are working on, and they will join a research group to get hands-on experience in areas at the forefront of experimental or theoretical nuclear science.

Section 003: The Science of Human Connection and Close Relationships (Social Science)
Dr. William Chopik, Department of Psychology
Tues 3:30-4:50pm; Max 15
This seminar will explore the science behind human connection and close relationships—an interdisciplinary field that asks deep questions about the uniqueness of humans and their loved ones. Students in the seminar will read and discuss articles on the science of close relationships and work in small teams on individual research projects on human connection. The results of these projects will be presented at the 2022 University Undergraduate Research and Arts Forum, and students will be given additional research dissemination opportunities.

Section 004: Democratic Discourse and Critique: The Middle East Voices of the Arab Uprisings (Arts & Humanities)
Dr. Camelia Suleiman, Department of Linguistics & Languages
Mon. & Wed. 12:40-1:30pm; Max 15
Since 2010, the Arab world has witnessed protest movements in nearly every country of the region. These protests have brought down dictatorships that had lasted a generation by offering the promise of democracy and social justice. The uprisings, however, have also resulted in civil wars, social strife and international interventions. This course will investigate the roots of these events (historic with a specific focus on the Middle East as it emerged from WWI, social, political), the course of their events, and their current status through many genres – including autobiography, news reports, film, fiction, blogs, and video – as well traditional academic sources. Students will explore the emerging variety of voices in the Arab world through these different media in order to engage with their generational peers from the Middle East. The course will also be introducing students to the basic tenets and principles of Islam, the dominant religion in the Middle East.

Section 005: Creativity in the Time of COVID-19: Art as a Tool for Combating Inequity and Injustice (Arts & Humanities)
Dr. Nancy Dejoy, Department of Writing, Rhetoric & American Cultures
Mon 4-5:20pm; Max 8
This seminar focuses on research related to a Mellon Foundation Just Futures grant. The grant focuses on the ways that the COVID-19 pandemic has disproportionately affected members of populations with histories of discrimination and injustice, and how they use creativity to cope. We will focus our interdisciplinary secondary research on the histories of the ways people from these groups use creativity to work for equity and social justice. The major project of the seminar will be an annotated bibliography of the readings we identify and collect. We will also identify and travel to at least one site that exhibits art related to the seminar theme (to be identified according to the interests of the group; fall or spring depending on when we can travel safely) and attend one local conference related to public art movements.
Section 006: Digital Theatre (Arts & Humanities)
Dr. Alison Dobbins, Department of Theatre
Tues. 3-3:50pm; Max 10
Seminar will cover key concepts at the forefront of digital theatre: combining music, programming, theatre and Slm. Students will be introduced to a variety of audience interaction methods currently being used in the field. The goal of this seminar is to equip students with the skills to integrate an artistic and analytic approach to solving problems.

Section 007: Molecular Phylogenetics and Evolution (Natural Science)
Dr. Patrick Edger, Department of Horticulture
Wed. 5:10-6:30pm; Max 12
Our understanding of evolution has been revolutionized by the ability to study the processes of genetic change at the molecular level. This seminar course will cover the mathematical, computational and molecular techniques required to explore the evolutionary diversity of the planet’s molecular (DNA) sequences and estimate the evolutionary relationships among species. This course will introduce students to tree thinking – how to correctly interpret phylogenetic trees. Phylogenetic trees serve as a powerful framework to estimate the timing of divergence events, analyze geographic distribution of species, and investigate the origin of evolutionary novelties. In addition, this course will provide students the opportunity to gain valuable hands-on experience with generating and analyzing their own data. Students will also be provided an opportunity to publish their research (as part of a larger class project) in a peer reviewed journal, and present their research at the University Undergraduate Research and Arts Forum.

Section 008: Global Slums, Migration, and Inequality (Social Science)
Dr. Guo Chen, Department of Geography, Environment & Spatial Sciences
Fri. 11-11:50am; Max 15
The seminar will engage students in examining global trends of poverty and inequality based on geographic measures, reading classical geographical texts and theories on inequality and poverty, and critically analyzing cases of inequality and poverty on multiple scales. A comparison of global slums will be the empirical focus of the second half of the course.

Section 009: Integrated Biosensors and Magnetic Resonance Imaging (Natural Science)
Dr. Chunqi Qian, Department of Radiology
Fri. 3-4:20pm; Max 10
This research seminar will guide students to learn the fundamental principles of wireless physiological sensors and Magnetic Resonance Imaging. The goal of this project is to design and fabricate wireless powered signal detectors and to demonstrate their application for pressure sensing both outside and inside an MRI scanner environment.

Section 010: Health Promotion among Diverse Populations (Natural Science)
Dr. Jiying Ling, College of Nursing
Tues. 12-12:50pm; Max 10
Students will actively participate in two health-promoting projects with low-income families who have young children enrolled in Head Start programs: 1) one project is the NIH-funded “FirstStep2Health” healthy eating and physical activity intervention to promote healthy lifestyle behaviors and reduce obesity among low-income parents and children; and 2) the other project is the Michigan Health Endowment Fund-funded “Happy Family, Healthy Kids” stress management and healthy eating intervention to reduce stress and promote healthy eating among low-income parents and children.

Section 011: Examining Coupled Human and Natural Systems to Address Complex Environments (Natural Science)
Dr. Steven Safferman & Mr. Steve Marquie, Department of Biosystems & Agricultural Engineering
Dr. Georgia Peterson, Department of Forestry
Wed. 3-4:20pm; Max 12
Students will learn to recognize, model, and analyze coupled human and natural systems (CHANS) in various scales and contexts. Understanding the mechanisms behind complex systems and working across disciplinary specialties are more effective ways to address current, complex environments. Students will conduct a research project on rural, suburban, and urban development, decline, and redevelopment by apply CHANS concepts.
**Section 012: Virus Adhesion to Surfaces (Natural Science)**
Dr. Volodymyr Tarabara, Department of Civil & Environmental Engineering  
Tues. 5-5:50pm; Max 8

Fundamentals and implications for public health. This Honors Seminar provides an opportunity to learn why and how viruses attach to various surfaces and how this knowledge can help safeguard public health. The seminar will cover foundational aspects of virus adhesion and train students on basic laboratory techniques of virus characterization. Hands-on training will only involve non-pathogenic viruses. Working in small teams, the students will select one or more viruses and one or more archetypal surfaces to assess virus/surface pairs in terms of likelihood of virus attachment. The selection will prioritize urban settings and scenarios relevant for protecting essential workforce (e.g., hospital personnel, municipal wastewater treatment plant operators). In their projects, the student teams will rely on literature data and employ adhesion models learned in the seminar. The projects will lead to conference papers and presentations at the annual University Undergraduate Research and Arts Forum in April 2022.

**Section 013: DEI on Wall Street**  
Dr. Kirt Butler & Dr. Antoinette Tessmer, Department of Finance  
Fri 9:10-10:00am; Max 15

This seminar will introduce students to the world of stock investment (Financial Analytics) while addressing the state of DEI on Wall Street (Behavioral Finance).

**Section 014: Inquiry in Numbers (Natural Science)**  
Dr. Olga Turanova & Dr. Preston Wake, Department of Mathematics  
Wed. 1:50-3:10pm; Max 10

A student-led introduction to number theory, including prime numbers, factorization, and modular arithmetic. No prior experience with math necessary.

**Section 015: History and Testimony in the Digital Age: Studying the Holocaust (Arts & Humanities)**  
Dr. Steven Weiland, Department of Educational Administration & Faculty Colleagues in the Jewish Studies Program  
Thurs. 2-3:20pm; Max 15

This Honors College Seminar will offer participants an opportunity for work in a unique digital resource for studying the Holocaust. Together with reading and discussing a one volume account of the Holocaust they will have access to the extraordinary USC Shoah Visual History Archive via the MSU Library. Working individually and in small groups with MSU faculty from several departments, and meeting in the seminar format, students will explore these questions: 1) What can be learned about the Holocaust and anti-Semitism from the perspective of those who survived to tell their stories? 2) What are the best methods for learning from testimony as a form of historical evidence? And 3) How can the evidence of testimony best be incorporated into Holocaust research and presented, including the use of digital resources? The focus will be on capitalizing on digital resources to complement those in print in doing research in a domain of inquiry with profound historical and personal multi-media meanings. And students can learn about the uses of digital multi-media presentations in their academic work beyond the Seminar itself.

**Section 016: Experimental Mathematics (Natural Science)**  
Dr. Robert W. Bell & Richard Edwards, Lyman Briggs College & Dept. of Mathematics  
Fri. 3-4:20pm; Max 9

Students will use computer algebra software to explore topics in current and historical mathematical research. Students will work in small teams and learn to collaborate and communicate effectively. Students will have the opportunity to explore problems beyond what is typically encountered in undergraduate mathematics course work and, thereby, gain a better understanding of what constitutes research in the mathematical sciences. By the end of the First semester, students will have a basic understanding of the SageMath computer algebra system and the Python programming language. Previous programming experiences not required. However, it is expected that students will have completed one semester of calculus at the level of MTH 132 or LB 118.