Section 001: Introduction to Materials Research using a Scanning Electron Microscope (ISP)
Dr. Carl Boehlert & Dr. Per Askeland, Chemical Engineering & Materials Science
Tues. 3:30-5:00pm; Max 16
This Honors 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 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 2020.

Section 002: Experimental Mathematics (ISP)
Dr. Robert W. Bell, Lyman Briggs College & Dept. of Mathematics
Fri. 3:40-5:00pm; Max 10
Students will use computer algebra software to explore topics in current 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 experience is not required. However, it is expected that students will have completed one semester course in calculus at the level of MTH 132 or LB 118.

Section 003: Histories in the Books: Exploring MSU’s Rare Book Collections (IAH)
Dr. Liam Matthew Brockey, Department of History
Tues and Thurs 10:20-11:40am; Max 16
This honors seminar will focus on the rare books held in MSU’s main library. In addition to examining examples of manuscripts and print from the past six hundred years, we will try to understand how these works made it from their authors and publishers to our library shelves. Students will learn about the history of printing by analyzing actual specimens from MSU’s rich collections, and acquire the technical skills for writing about book history. The primary research project will focus on the provenance, that is, the origins and chain of ownership, for these books over the centuries. We will learn about readers and reading from the notes left in our books, and about collectors and collecting from the bookplates that buyers and sellers left in them. Students will collaborate on a class website intended to present, textually and visually, their findings about MSU’s collections, telling the story of how our books came to campus. Individual projects will be presentable at the UURAF.

Section 004: The Study of Racial and Ethnic Relations in Contemporary United States (ISS)
Dr. Clifford L. Broman, Department of Sociology
Wed. 12:40-2:00pm; Max 8
This seminar will focus on racial and ethnic relations and stereotypes in the Contemporary United States. The study of racial and ethnic relations is a timely and important subject in our country today. In the past sixty years, there has been substantial progress in race and ethnic relations in the United States. Legal barriers to full participation have been dismantled, racial attitudes have become more egalitarian, and programs like Affirmative Action have been implemented that have had some success in improving opportunities for people of color. At the same time, we continue to observe the racist attitudes and discriminatory behaviors of many people, police shootings of particularly African and Mexican American men, and actually greater residential segregation than in the past. Therefore while there has been substantial progress in racial and ethnic relations, there are still important issues to study with the hope of further improving racial and ethnic relations. Some of the issues to be explored include: (a) the systemic nature of racism and racial disadvantage in the U.S.; (b) the role of stereotypes in relation to the practice of prejudice and discrimination; and (c) the link between structural disadvantages faced by racial and ethnic minority populations and economic and social outcomes. Seminar participants will study this topic from a sociological perspective in the classroom, and then learn how to design, and then conduct, a research study to examine hypotheses generated by the class. The study will use both quantitative and qualitative techniques to collect original data to test our hypotheses.

Section 005: Stock Portfolio Risk Diversification: Myth or Reality?
Dr. Kirt Butler & Dr. Antoinette Tessmer, Department of Finance
Fri 9:00-9:50am; Max 15
Stock portfolio risk diversification: myth or reality? Are you a Bitcoin trader? Or do you better describe yourself as a risk-averse Treasury bond investor? This seminar gives the opportunity to test yourself with a $1M portfolio to be invested in high risk
assets. The seminar will discuss risk definitions and measurements when related to stock, bonds, futures, cryptocurrencies, and other classes of assets. Using Bloomberg and The Wall Street Journal as our official sources for current financial news, we will track the effects of company and market news on portfolio risk. You will be responsible for investing your wealth while carefully controlling the risk level of your portfolio. Various risk management methods will be selected and tested. Time will tell whether your method is efficient at managing risk. Which method performs best and why? Those are the questions this seminar will attempt to answer.

**Section 006: Reading the Lansing Landscape (IAH)**
Dr. Melissa Charenko, Lyman Briggs College and Department of History  
Thurs. 11:00-12:20pm; Max 12
This seminar will introduce students to the history of Lansing and the surrounding region, especially the contributions of historically underrepresented groups (Native Americans, African Americans, Latin@s, immigrants, working class, etc.). Through a series of fieldtrips to sites in the local community, students will learn to read the landscape and interpret historical documents. The seminar will culminate in research published on the Lansing Ward History Project and the development of walking tours of East Lansing presented in partnership with the Historical Society of Greater Lansing.

**Section 007: Molecular Phylogenetics and Evolution (ISB)**
Dr. Patrick Edger, Department of Horticulture  
Wed. 4:30-5:50pm; 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 planets 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: From Atomic Nuclei to Stars: Research at the National Superconducting Cyclotron Laboratory (ISP)**
Dr. Heiko Hergert & Colleagues, NSCL/FRIB and Department of Physics and Astronomy  
Thurs. 3-4:20pm; 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 009: Using fMRI to Link Brain Network Activity with Human Task Performance (ISB)**
Dr. Jie Huang, Department of Radiology  
Fri. 3:30-4:50pm; Max 6
The activity of brain neural networks gives rise to simple motor behaviors as well as complex behaviors. To understand how the network activity is transformed into human behaviors, it is necessary to identify task-specific networks and analyze the dynamic network activity that changes with time. This research seminar will guide students in learning the fundamental principals involved in functional magnetic resonance imaging (fMRI) and the software used to analyze fMRI data. The goal of the project is to allow a team of six students to design and implement a finger-tapping fMRI experiment to identify the finger-tapping-associated network and analyze the dynamic network activity, aiming to link the network activity with the task performance.
Section 010: Explorations into Syntactic and Semantic Variation (IAH)
Dr. Alan Munn and Dr. Cristina Schmitt, Department of Linguistics
Tues. 5-6:20pm; Max 12
Although you don’t notice it very often, for many of the thoughts you might want to express, there is more than one way to say exactly the same thing. For example, you might say “I wanted to go to the party” but you could also say “I wanted to have gone to the party” or you might say “I should’ve gone to the party” but you might also have said “I should’ve went to the party”. Both pairs of sentences are possible, and both pairs occur naturally in our speech, and each member of the pairs seems to express the same basic thought. So what’s the difference, and how do we “decide” which one to use? These are just a few of the subtle ways in which language can vary. In this seminar we will investigate the nature of this type of variation in adults and possibly pre-school age children. You will be responsible for designing and running an experiment or set of experiments within the general areas of current research on syntactic and semantic variation within the MSU Language Acquisition Laboratory. No background in linguistics is required, but you should have some interest in cognitive science and the scientific study of language in particular.

Section 011: Global Shocks and Local Jobs: County-by-County Responses to Trade Shocks (ISS)
Dr. Michael Olabisi, Agricultural, Food, and Resource Economics
Tues. 1-2:20pm; Max 10
This seminar will introduce students to foundational concepts of international trade relationships and the impacts of U.S. linkages to the global economy. Students will learn about the intended and unintended consequences of trade policies and the role of the various governments and institutions in creating or undermining stability of local economies within the United States. The seminar has two goals: First, by focusing on the relationship between policy and demand shocks – surprise events that dramatically alter demand for goods or services – the seminar will illustrate the relationship between trade policy and its economic consequences. Second, by focusing on local economies, the seminar will explore how trade contributes to the economic shocks experienced by the areas that produce historically under-represented student populations – minority-majority areas, as well as agricultural communities.

Section 012: Patterns of Change in an Evolving Brain at Temporal Niches Transitions (ISB)
Dr. Laura Smale and Dr. Barbara Lundrigan, Department Psychology and Department of Integrative Biology
Fri 10:20-11:40am; Max 6
This seminar will introduce students to conceptual issues and hands-on research focused on questions at the interface of neuroscience, animal behavior, and evolutionary biology. It will be centered on evolutionary pathways that have led animals to be active during the day, the night, or both (i.e. to occupy different “temporal niches”), and on associated changes in the nervous system. We will focus on sensory regions of the brain because the relative value of some cues (e.g. visual ones) and other cues (e.g. olfactory) may be quite different for animals that are active when the sun is up vs. after it has set. These research projects are germane to major, ongoing, conceptual debates about brain evolution, and its relation to development, more generally. The course will include informal lectures/discussions and readings to provide a broad background on brain and behavioral evolution, followed by an in depth look at the major theoretical issues related to evolution of brain structures and pathways, and then more focused discussion of research papers that are centered on patterns of evolutionary change in sensory regions of the brain and their relationship to temporal niche transitions. In parallel with this, students will learn about research methods that can be used to address these questions. This will include a mixture of demonstrations and hands-on experience to learn about (1) collection and processing of brain tissue, (2) identification of brain structures and circuits involved in sensory processing and (3) stereomicroscopy and associated software to obtain two dimensional images of these regions and calculate volumes from series of those images. Toward the end of the fall semester, students will begin independent projects focused on comparing volumes of several interconnected brain structures of at least four species that occupy different temporal niches. Students will present the results of their research at the University Undergraduate Research and Arts Forum (UURAF).

Section 013: The Sands of Mars and The Assessment of Potential Habitability (ISP)
Dr. Michael A. Velbel, Department of Geological Sciences
Tu & Th 4:10-5pm; Max 15
The scientific search for evidence of past or present life on Mars is based on the search for evidence of liquid water, and evidence for the physical state and chemical composition of that water. Much evidence for the state and composition of past water is preserved in the minerals that may have reacted with past, no-longer-extant, water. To improve interpretation of the environmental significance of the coarsest grains imaged using the Phoenix Optical Microscope, student participants in this seminar will examine the shapes and surface textures of sand grains in instrumentally acquired images of sand from the Phoenix Mars Lander landing site on Mars and compare their attributes with those of similar grains from well-studied terrestrial (mostly basaltic) analogs. Beginning with visual and simple quantitative classification methods used by geologists to
characterize and describe sediment-grain shapes and surface textures, student participants will examine a variety of grain types in representative mission and analog-sample images and make preliminary assessments of the alteration, transport and deposition/accumulation histories of the sands.

Section 014: History and Testimony in the Digital Age: Studying the Holocaust (IAH)
Dr. Steven Weiland, 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. 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 uses of digital resources? The focus will be on capitalizing on digital resources in doing research in a domain of inquiry with profound historical and personal meanings. And students can learn about the uses of digital multi-media presentations in their academic work beyond the Seminar itself.