Section 001: Introduction to Materials Research using a Scanning Electron Microscope
Dr. Carl Boehlert & Dr. Per Askeland, Chemical Engineering & Materials Science
Tues. 3-3:50pm
This seminar will introduce students to the concepts and applications of scanning electron microscopy (SEM) in modern materials-related research. After a semester of informal lecture/discussions and lab demonstrations, students will participate in a materials-based research project under the direction of the participating instructors. Scanning electron microscopy is an ideal tool for researching a wide variety of materials-related issues such as manufacturing, fracture analysis, mechanical and deformation behavior, phase transformations, etc. It is also an excellent means for introducing undergraduate science majors to the multidisciplinary nature of materials science and engineering. Students in all major scientific disciplines, including physics, chemistry, engineering, biochemistry, physiology, etc. can play a role in materials-based research. The course will conclude with the students actively involved in the design and performance of a research study under the joint direction of the participating instructors. The head instructor hopes and anticipates that some of the students will then be interested in and qualified for further participation in research in faculty’s lab during the remainder of their undergraduate careers. The students will present the results of their research at the University Undergraduate Research and Arts Forum (UURAF). The specific project will depend on the state of student’s interests at that time. However, the student project will likely focus on SEM analysis of ceramics, composites, biomaterials, metallic alloys, etc.

Dr. Danita Brandt, Geological Sciences
Wed. 3-3:50pm
Participants will be introduced to the resources of University Archives and MSU Libraries to identify women who have served as MSU faculty in STEM (Science, Technology, Engineering, and Math) departments during the period 1940-1980. No previous experience or expertise is required. Students will hone their skills in media literacy, writing, research, collaboration, and critical thinking to write biographies of these women that will be published online in an MSU-hosted website. Further, seminar participants will mine the collective biographies to identify factors or recurring themes in the personal and professional lives of these female faculty that might have broader implications for understanding the role of women in STEM disciplines, at MSU and beyond. The seminar will feature interactions with retired and current female STEM faculty, during our weekly seminar meetings and as part of a special seminar/panel discussion to be offered during Spring Semester, 2018. The biographies, department histories, and broader implications will be the basis of seminar presentations at UURAF.

Section 003: Stock Portfolio Risk Diversification: Myth or Reality?
Dr. Kirt Butler & Dr. Antoinette Tessmer: Finance
Fri 9:10-10am
Stock portfolio risk diversification: myth or reality? Do you consider yourself a risk-averse investor? Or do you better describe yourself as a risk-lover stock trader? This seminar gives the opportunity to test yourself with a $1M stock portfolio to be invested on the stock market. The seminar will discuss risk definitions and measurements when related to stock investment. Using The Wall Street Journal as our official reference for current financial news, we will track the effect 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 if your method is efficient at reducing risk. Which method performs best and why? Those are the questions this seminar will empirically answer.

Section 004: Molecular Phylogenetics and Evolution
Dr. Patrick Edger, Horticulture
Thurs. 4:30-6pm
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.
Section 005: From Atomic Nuclei to Stars: Research at the National Superconducting Cyclotron Lab
Dr. Heiko Hergert, Physics & Faculty Colleagues at NSCL
Thurs. 3-4:20pm
The National Superconducting Cyclotron Laboratory (NSCL) has just celebrated 50 years of beam. For 50 years, scientists from MSU and all over the world have been 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 one of the research groups to get hands-on experience in areas at the forefront of experimental or theoretical nuclear science. Note: Regular meeting times will occur during the first 4 weeks and end of the seminar. Otherwise, hours will be arranged between students and their faculty mentor for regular, weekly work.

Section 006: Temporal Niche & The Mammalian Brain
Dr. Laura Smale, Psychology & Integrative Biology; Dr. Barbara Lundrigan, Integrative Biology & MSU Museum
Fri. 10:20-11:40
This seminar will introduce students to conceptual issues and hands-on research focused on questions at the interface of animal behavior, neuroscience, and evolutionary biology. It will be centered, specifically, on evolutionary pathways that have led animals to be active during the day, the night, or both, and on associated changes in the brain. We will focus on sensory regions of the brain because the sensory world changes considerably as the sun comes up during the day and darkness falls at night. The course will include several informal lectures/discussions and readings to provide a broad background on brain and behavioral evolution, followed by progressively more focused discussion of research questions related to temporal niche transitions and evolutionary changes in sensory regions of the brain. In parallel with this, students will learn about research methods employed here at MSU to address these questions. This will include a mixture of demonstrations and hands-on experience to learn about collection and processing of brain tissue, stereomicroscopy, photography, and software used to identify and measure different regions of the brain from serial sections. Toward the end of the fall semester, students will begin independent projects focused on comparing volumes of several brain regions of at least two species representing distinctly different temporal niches.

Section 007: The Psychology of Time & Rhythm
Dr. J. Devin McAuley, Psychology
Fri. 12:40-2:30pm
This seminar will explore the scientific literature on the human experience of time and rhythm – a fascinating interdisciplinary topic that is central to the understanding of brain and mind. Students in the seminar will read and discuss scientific articles on the topic of time and rhythm, and will work in small teams of 2-3 individuals on the design and execution of behavioral experiments that investigate the neural and cognitive bases of music and language relationships.

Section 008: Researching US Presidential & Congressional Politics
Dr. Ian Ostrander, Political Science
Tues. 3-4:20pm
The ability to find, interpret, and quickly summarize complex government documents is an essential skill for working in politics and these skills translate well into many subfields of social science research. The primary goal of this course is to familiarize the student with a variety of document sources related to the American presidency and the U.S. Congress while teaching research skills through the coding and analysis of such documents. For example, we will use the Congressional Record and the Public Papers of the President to examine trends across time. Students will be given a foundation of research basics including instruction on data management and content analysis. No background in political science or research is necessary.

Section 009: Bioinstrumentation and Medical Imaging
Dr. Chunqi Qian, Radiology
Wed. 3:30-5pm
This research seminar will guide students to learn the fundamental principles of bioinstrumentation and its applications in Magnetic Resonance Imaging. The goal of the project is to allow a team of 6 students to design and fabricate electromagnetic signal detectors and demonstrate their application in medical imaging on animal subjects. This course will not only allow students to get exposed to the basic principle of bioinstrumentation, but also enable them to have hands-on experience in various aspects of medical imaging. Required: one year of college-level physics.
Section 010: Systems Approach for Recovering Resources from Wastes
Dr. Steven Safferman, Steve Marquie & James Wallace, Biosystems and Agricultural Engineering
Thurs. 3-4:20
Students will learn about converting wastes to resources, including cleaning water, producing energy from carbon, and recovering agricultural nutrients. With this knowledge, an experimental plan will be developed and implemented to collect data using ultrasonic homogenization for pretreatment of waste feedstocks for anaerobic digestion and membrane separation. Results from experimentation and literature will be used to estimate the cost, energy use, and emissions of a commercial-scale system.

Section 011: The Latin Lens
Dr. John Valadez, Media & Information; English; Film Studies Program
Wed. 3:30-5pm
This seminar will introduce students to the history of Latino representation in American film and television across the 20th and early 21st centuries. Students will learn to collect data and analyze historic trends in relation to changing social conditions across 110 years of American cinematic history. The seminar will give a framework for students to create dossiers on the most influential Latino figures in film and television history. Together we will deconstruct how and why those figures were able to impact American culture at the particular time and context in which their work appeared. Students will learn to use film and television as a bellweather to chronicle the history of race, myth making, stereotype, caricature, cultural integration, and power by understanding and documenting the evolution of the Latin image on screen and the changing agency of Latino artists behind the camera. The research generated will contribute to a larger initiative: the development of a six-hour documentary series (along with a companion book) tentatively titled *The Latin Lens*. The series—intended for a prime-time national broadcast on Public Television (PBS)—is being developed in association with WKAR.

Section 012: The Sands of Mars and The Assessment of Potential Habitability
Dr. Michael A. Velbel, Geological Sciences
Tu & Th 4:10-5pm
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 013: History and Testimony in the Digital Age: Studying the Holocaust
Dr. Steven Weiland, Educational Administration & Faculty Colleagues in the Jewish Studies Program
Wed. 3-4:20pm
This Honors College Seminar will offer participants an opportunity for work in a unique digital resource for studying the Holocaust and to conduct and present research in a new format. Students will have access to the extraordinary University of Southern California Shoah Visual History Archive via the MSU Library. Working individually and in small groups with MSU faculty from several departments, and meeting periodically in the seminar format, students will explore these questions: 1) What can be learned about the Holocaust 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 presentations in their academic work beyond the Seminar itself. The results of student research projects will be presented at campus and public programs.