

UGS 200H: HONORS RESEARCH SEMINARS 2024-25

3 CREDITS * FALL & SPRING SEMESTER ENGAGEMENT REQUIRED * PASS-NO PASS *

POTENTIAL INTEGRATIVE STUDIES SUB – FOR HC STUDENTS ONLY; ASP NOT ELIGIBLE FOR SUB

Section 001: Introduction to Materials Research through Scanning Electron Microscopy (NS)

Dr. Carl Boehlert & Dr. Per Askeland, Department of Chemical Engineering & Materials Science

Mon. 9:10-10am; Max 16

This 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. This honors research seminar will also allow the students to perform research using the knowledge they gained of the SEM.

Section 002: Discovering Biodiversity (NS)

Dr. Brian Keas & Dr. Peter White, Department of Entomology

Tues 4-5:20pm; Max 12

We have lost nearly 3 billion breeding adult birds in North America since 1970 and multiple studies show insect biomass declines of up to 10% per decade. Despite the importance of insects and their relatives as critical components in ecological food webs and ecosystem functions, we lack baseline information about which species are present in our local environments or potential changes over time in most of these animal groups. Students in this seminar will learn the importance of biodiversity and how to measure it, identify historical causes and actions impacting biodiversity loss, and review scientific literature for past biodiversity research on MSU's campus and surroundings. Working in small teams, they will document the abundance and diversity of selected animal groups using techniques that lend themselves to long-term research and to future citizen science efforts. Taxonomic focus groups will vary based on student interest but may include moths, pollinators, aquatic or ground-dwelling invertebrates, flying insects or those important in decomposition and forensic entomology. Projects will provide important baselines for future scientific research on campus biodiversity. Students will present their results at the 2025 UURAF and explore submission to other appropriate scientific outlets.

Section 003: From Atomic Nuclei to Stars: Research at the National Superconducting Cyclotron Laboratory & Facility for Rare Isotope Beams (NS)

Dr. Yue Hao, Dr. Paul Gueye, Dr. Sean Liddick, Dr. Kei Minamisono, Dr. Wolfgang Mittig, Dr. Artemis Spyrou, Dr. Ryan Ringle, Dr. Jaideep Singh, Dr. Vladimir Zelevinsky, Dr. Xilin Zhang, & Dr. Ting Xu, NSCL/FRIB and Department of Physics and Astronomy

Wed. 5-5:50pm; Max 10

With the completion of the Facility for Rare Isotope Beams (FRIB), the most powerful heavy-ion accelerator facility in the world, scientists from MSU and all over the world are conducting nuclear physics research of producing and studying exotic nuclei, discovering new phenomena, and creating new theoretical models to explain and predict nuclear characteristics. In this Honors Research Seminar, students will learn about some of the exciting research projects that FRIB faculty are working on, and they will join a research group to get in-depth experience in areas at the forefront of nuclear and accelerator science.

Section 004: Democratic Discourse and Critique: The Middle East Voices of the Arab Uprisings (AH/SS)

Dr. Camelia Suleiman, Department of Linguistics, Languages & Cultures

Mon. 10:20am-12:10pm; 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. The course will focus on Syria and its humanitarian crisis.

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Section 005: Molecular Phylogenetics and Evolution (NS)

Dr. Patrick Edger, Department of Horticulture

Wed 3-4:20pm; 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 006: Food-Body-Mind Intervention: Promote Whole Child Health

Dr. Jiyong Ling, College of Nursing

Fri. 8:30-9:50am; Max 10

Students will actively participate in a large NIH-funded research study targeting preschoolers aged 3-5 years old from low-socioeconomic status. The purpose of the trial is to evaluate the effects of the 16-week school- and home-based, multi-component, Food-Body-Mind intervention on improving both preschoolers' and caregivers' mental, emotional, behavioral, and physical health. In addition, all students will continue to design and implement an experimental study to compare the physical activity and sleep data of three popularly used commercial activity trackers (Fitbit Luxe, Gramin Vivosmart, and Amazfit Band 7 Fitness & Health Tracker) with the Actigraph (the current gold standard approach for monitoring physical activity and sleep). Students will act as both researchers and participants in the experimental study and learn how to use data to support research and practice decisions. We will also engage students to host a booth at the annual Teddy Bear Picnic to promote healthy lifestyle and screen for fruit/vegetable intake using skin carotenoids with Veggie Meter in our local communities.

Section 007: Gender Diversity and Sexuality in Africa (SS)

Dr. Jonathan Choti, Department of Linguistics, Languages & Cultures

Mon. & Wed. 9:10-10:30am; Max 15

This seminar will allow students to explore and learn about gender diversity and sexual orientation and expression as experienced in African societies. Topics such as gender roles, diversity, equity, inclusion, social justice, LBGTQIA+, and human rights will feature in this seminar. Students will read articles and other texts, watch movies and video clips, and interview individuals in Africa and members of the MSU community from Africa to gather information for their class projects. They will work in small teams on individual research projects. They will write individual research papers and make in-class PowerPoint presentations and poster presentations at the spring 2025 University Undergraduate Research and Arts Forum (UURAF). They will have the option of publicizing their research findings at academic conferences and/or peer-reviewed journals on women's studies and sexuality.

Section 008: Sustainable Finance: US, Japan, and Norway

Dr. Antoinette Tessmer, Department of Finance

Fri 10-10:50am; Max 16

This seminar investigates the impact of sustainability on financial markets in the US, Japan, and Europe. Participants will conduct research in collaboration with students from Setsunan University (Osaka, Japan) and the Norwegian School of Economics (Bergen, Norway) to compare and contrast the effects of sustainable finance on US, Japanese, and European financial markets. Is/should the concept of stock "value" be sustainability dependent? Is the perception of investment "risk" enhanced or reduced by sustainability? Have Japanese and European financial markets embraced sustainability more proactively than or differently from US markets? How do understandings, beliefs, and values about sustainable finance of an American student compare to the values of students in Japan and Norway? How may internationally and interculturally implicated beliefs and values shape decision making in sustainable investments? If you are intrigued by those questions, we invite you to join the conversation. This seminar gives an opportunity to manage a simulated \$1M stock portfolio and to enhance your global awareness.

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Section 009: Integrated Technology for Physiological Sensing and Imaging (NS)

Dr. Chunqi Qian, Department of Radiology

Thurs. 4:10-5pm; Max 16

Students in this seminar will develop integrated detectors for physiological sensing and imaging. Students will be introduced to conceptual and practical aspects of brain imaging, helping students to understand the capability and application scenarios of various imaging modalities with a focus on MRI (magnetic resonance imaging). Students will be led through a project to build a wireless physiological sensor that can operate inside an MRI scanner. Then students will leverage these skills to address a unique application for integrated sensors in their own field of study resulting in a proof-of-concept experiment that demonstrates the project's feasibility.

Section 010: Positive Psychology: The Science of What Makes Life Worth Living (SS)

Dr. Bill Chopik, Department of Psychology

Thurs. 3:30-4:50pm; Max 9

This seminar will explore the basic tenets and science underlying the field of positive psychology—an approach that focuses not on mental illness but instead on the positive experiences, traits, and institutions that help individuals be resilient and thrive in life. In other words, positive psychology is often characterized as the scientific approach to understanding why life is worth living. Students in the seminar will read and discuss articles on the science of positive psychology and work in small teams on individual research projects on positive psychological processes. The results of these projects will be presented at the 2025 University Undergraduate Research and Arts Forum, and students will be given additional research dissemination opportunities.

Section 011: Co-creating Autistic Youth Mental Health Screening Tools

Dr. Susan Bonner & Dr. Celester Campos-Castillo, Department of Media & Information

Tues. & Thurs. 10:20-11:40am; Max 16

Help us transform mental health care for autistic adolescents. Currently, autistic youth are far less likely to complete a depression and anxiety screening tool. We aim to remove barriers for autistic youth who have less access to mental health care than their neurotypical peers. We are transforming and co-designing the current mental health screening tool with autistic youth, nurses, educational psychologists, parents and guardians. Students in the seminar will work hands-on with faculty and autistic youth with community partners, developing an interactive prototype, which may include UX design, illustration, animation, and film as well as analyzing data and writing reports.

Section 012: The Study of Racial and Ethnic Relations in Contemporary United States (SS)

Dr. Clifford Broman, Department of Sociology

Mon. & Wed. 3-4:20pm; Max 10

This seminar will involve students in a research study of racial and ethnic relations in the US. First, we will explore the background and theories about race and ethnicity, then discuss racial and ethnic group experiences, and then conduct a study. The study will involve students conducting research on topics related to race and ethnicity. Students will be able to choose their own topics, with instructor approval.

Section 013: Arab and Middle Eastern Immigrant Voices: Building Bridges for DEI (SS)

Dr. Ayman Mohamed, Department of Linguistics, Languages & Cultures

Fri. 8:30-9:50am; Max 10

This seminar allows students to participate in a community-engaged learning experience to explore backgrounds, cultural identities, needs, frustrations and aspirations of the diverse Arab and middle eastern immigrant communities who reside in their localities. We will read scholarly work and research articles highlighting the Arab diaspora and investigating the ways in which identity continues to be imagined and re-constructed in and among Arab communities around the world. We will learn about the emergence and influence of Islam in Arab culture, religious and ethnic minorities within the Arab world and the origin and evolution of the Arabic language. Students will also discuss Arab Spring in different Arab countries, refugee crises and current challenges and opportunities. Students will write individual research papers and make in-class presentations and poster presentations at the spring 2024 University Undergraduate Research and Arts Forum (UURAF). All UGS 200H courses meet regularly in the fall AND spring semesters. Spring times will be arranged with the instructor. Students must remain engaged throughout the entire year to receive credit. These courses are graded Pass/No Pass. Enrollment for upperclassmen is limited to rising sophomores in good standing with the Honors College.

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Section 014: Circular Economy 101 (SS)

Dr. Rex LaMore, Mary ZumBrunnen & Affiliated Faculty, Center for Community & Economic Development
Wed. 8-8:50am; Max 10

In the current U.S. and global economy our world functions in a linear fashion following a “take, make, waste” model. This extraction, production, consumption and disposal of resources has created or impacted extraordinary challenges from climate change to locally overflowing landfills. In this Honors Research Seminar, students will: 1) learn of, examine and discuss the challenges of resource recovery and reuse as well as regenerative practices and influencing policy; 2) with focus on Michigan’s small and mid-sized business in economically distressed areas, students will look through the lens of their disciplinary field and research industry challenges to circularity, and; 3) students will have the opportunity to contribute to an emerging body of knowledge on the circular paradigm shift, building and scaling solutions. Final projects will consist of a research paper related to their discipline on circularity and circular intervention. A poster display and invitation to present at a tentative 2024 circular economy summit is encouraged.

Section 015: The Practice of Magic (AH)

Dr. Dave Watson, Dept. of Writing, Rhetoric & Cultures
Fri. 1-2:20pm; Max 15

The earliest human texts record the existence of individuals within their communities whose role was the practice of magic. For thousands of years magic has been part not only of the human imagination, but of human ritual practice. This seminar will teach you about magic: what it is, how and why it is done, and what it means. We will explore esoteric texts, grimoires, and books of occult philosophy. This seminar will also teach you to do magic. We will make lunar and stellar observations, collect plant specimens, learn to make tinctures, foci, and other magical apparati. We will make small charms and large ritual spellwork, and you will learn the principles of designing your own magic, while simultaneously engaging in the scholarly exploration of the principles of philosophy, religious studies, and cultural anthropology that inform the meaning of magical practice. The seminar will culminate in a piece of original group spellwork that will be displayed at the annual University Undergraduate Research and Arts Forum (UURAF) in the spring of 2025.

Section 016: Interdisciplinary Research and the Community Garden (SS)

Dr. Melissa Fore, James Madison College
Dr. John Waller, Department of History
Samyuktha Iyer, Social Science Scholars Program
Fri. 10am-1pm; Max 15

The class will begin with a series of readings about poverty, nutrition, community activism, urban farming, and community engagement. Within the first month, however, we will switch to a focus on the students working in smaller teams, with individual faculty members as mentors, to begin developing a practical plan of action. Individual groups will be responsible for identifying accessible experts with whom to discuss possible research methods, surveying the existing scholarly literature, and finding local practitioners with whom to discuss best practices. Specific areas of research will include: 1. Poverty rates in different Lansing census tracts. 2. The measurable benefits of community gardens. 3. How best to develop out-of-school time programs that have positive effects on youth and reflect their needs, capacities, and aspirations. 4. The benefits, physiological and psychological, of spending time in green spaces. 5. How to work with agencies, such as housing shelters, in ways that do not impose extra burdens on them and which ensure the safety of their residents. 6. How to achieve community buy-in and interaction in neighborhoods with comparatively low levels of trust and low existing rates of interaction. 7. How best to design a food provision system which ensures that food insecure groups receive fresh, nutritious food.

Section 017: Socially Engaged Art as Research (AH)

Dr. David McCarthy, Residential College in the Arts & Humanities
Fri. 10-11:20am, Max 15

The arts have been the site of numerous efforts since World War II to build more democratic social relations. Students in this class will develop an interdisciplinary perspective on these efforts through direct engagement with an eclectic body of primary and secondary sources, including works by experimental artists and socialist critics. They will complete independent research projects on specific case studies, and apply their developing knowledge to the design and implementation of actual arts events, collaborating with one another and with community partners, tapping into resources and networks maintained by the MSU Arts Living-Learning Community. No prior training or experience is required. Students will be encouraged both to use their own existing skills and to experiment with new skills.

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Section 018: 3D-Printing and Digital Image Correlation Analysis of Structures (NS)

Dr. Weiyi Lu, Department of Civil & Environmental Engineering

Mon. 3-3:50pm; Max 12

This Honors Research Seminar (HRS) endeavors to foster an intuitive understanding of structural behavior among students by visualizing deflection and internal force development in structures. The seminar introduces two emerging techniques—3D printing and Digital Image Correlation (DIC)—for the rapid fabrication of small-scale structures and non-contact strain field measurements. It covers key concepts in Civil Engineering, Materials Science and Engineering, and Mechanical Engineering. Students will apply the acquired knowledge and advanced experimental skills to design structures. The outcomes of these creative design projects will be shared at the 2025 Annual University Undergraduate Research and Arts Forum (UURAF).

Sect 019: Cocoa to Chocolate: Trade and Sustainability in Developing Economies (SS)

Dr. Michael Olabisi & Jiawen Liu, Department of Community Sustainability & Department of Agriculture, Food and Resource Economics

Tues. & Thurs 9:10-10:30am; Max 15

The seminar will introduce students to international trade fundamentals, with a focus on developing economies, and how U.S. consumption is broadly linked to imports or inputs from developing economies. Students will learn about trade costs, and the barriers to trade that lead to those costs. They will also learn the intended and unintended consequences of policies that affect trade. The seminar has two goals: First, to introduce students to the idea of trade – with a focus on chocolate – and the processes that it follows from a cocoa-bean to the chocolate bar in the store or flavor on cereal. Second, to highlight the challenges of sustainability and development linked to trade, including the trade in cocoa and chocolate. Students will learn to analyze trade data as part of their coursework. They are expected to present projects based on their coursework and data analysis at UURAF.

Sect 020: Health Promotion Among Diverse Urban Adolescents

Dr. Lorraine Robbins, College of Nursing

Wed. 4:10-5pm; Max 15

This seminar will provide opportunities to contribute to a research project to promote healthy eating and physical activity among racially and ethnically diverse adolescents living in urban communities. Students will have the opportunity to be part of a multidisciplinary team and gain hands-on experiences in participant recruitment, data collection, intervention delivery, evaluation, and/or dissemination. Every involved student is expected to have the opportunity to present their scholarly project at the 2025 University Undergraduate and Arts Forum (UURAF) and other scientific conferences and may participate in manuscript writing. Students will also have an opportunity to learn about the safety and efficacy of study trials.

Note: Students in this course need to be available either 7am-1pm for the data collection or 1130am-7pm for the intervention experience one day of the week (Mon-Thurs) across fall and spring semesters to be involved in the on-site component of the school-based research program.

Sect 021: Financial Analysis and Empirical Research: Bridging Theory and Practice

Dr. John (Xuefeng) Jiang, Department of Accounting & Information Systems

Fri. 3:10-4pm; Max 8

Uncover the practical aspects of financial analysis and empirical research in this hands-on seminar. Engage with real-world financial statements to delve into contemporary issues, illustrated by examples such as the labor costs in the ongoing autoworkers strike and the trials of Sam Bankman-Fried, and derive policy insights. This seminar provides a platform to bridge foundational accounting and finance concepts with empirical analysis on topical issues, guided by a seasoned accounting professional.

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Sect 022: The Sands of Mars: Assessment of Potential Ancient Microbial Habitability and Preparation for Mars Sample Return (NS)

Dr. Michael Velbel, Department of Earth & Environmental Sciences

Tues. & Thurs. 3-3:50pm; Max 15

The scientific search for evidence of past life on Mars is based on searching rocks and unconsolidated grains for evidence of past liquid water and the physical state and chemical composition of that water. Samples of regolith (unconsolidated grains) and sedimentary rocks have been collected at Jezero crater, Mars, by Mars 2020 (M2020) rover Perseverance. A future mission will return to Earth with the samples (Mars Sample Return, MSR). Until then, planning for processing of the samples must use terrestrial analogs and simulants – terrestrial materials that are like materials on Mars as characterized by the instruments on past and present Mars landers and rovers – to anticipate many properties of the samples collected by Perseverance. We will use microscopic imaging methods to characterize sand grains in terrestrial analogs of regolith on Mars. Depending on M2020 mission progress and MSR program priorities at the time of the seminar, we may (1) assess the fidelity of Mars regolith analogs with respect to mission-characterized Mars regolith, (2) test – on analogs – common methods used on terrestrial sand grains to infer the grains' origins, alteration, transport and deposition / accumulation histories, for possible future application to returned samples, and/or (3) fill knowledge gaps about paleoenvironmental/paleohabitability indicators and potential biosignature preservation and/or physical-textural-mineral biosignatures in anticipation of future laboratory analysis of eventually returned samples.