age-friendliness in U.S. institutions to describe their insights regarding the state of age diversity on campuses and the experiences of students, faculty, and staff that call for greater age inclusivity. Morrow-Howell and colleagues will present data from interviews with DEI officers that identify institutional considerations for inclusion efforts. Andreoletti and colleagues will offer specific curricular and related strategies for connecting age-inclusivity efforts with DEI campus efforts. Gugliucci will discuss considerations regarding age-inclusive images and messages in health professions education including the inclusion of identifiable DEI objectives in syllabi. As discussant, GSA president Lichtenberg will comment on age-inclusivity efforts in higher education within GSAs broader commitment to diversity, equity, and inclusion.

MAKING THE CASE FOR AGE INCLUSIVITY IN HIGHER EDUCATION

Lauren Bowen1, Joann Montepare2, Nina Silverstein1, Susan Whithourne1, and Celeste Beaulieu1. 1. University of Massachusetts Boston, Boston, Massachusetts, United States, 2. Lasell University, Newton, Massachusetts, United States, 3. University of Massachusetts Amherst, Amherst, Massachusetts, United States

Often viewed as institutions primarily serving 18-24-year-old student populations, U.S. colleges and universities are age-diverse. In our recent national study of AFU institutions, 21 campuses maintaining age data reported that 12,718 faculty (39.24% of faculty) and 20,361 staff (42.31% of staff) were ages 50+. Additionally, 22 campuses reported 7,080 students (1.58%) ages 50+. Despite higher education's attention to diversity, equity, and inclusion (DEI), age is often overlooked; therefore, universities may need strategies for improving age inclusivity. Across 2,447 open-ended survey responses from our study, faculty, staff, and students describe experiences with age inclusivity (e.g., feeling valued) and exclusion (e.g., feeling unwelcome), and many call for greater sensitivity to aging in existing DEI efforts, such as more age-inclusive language in classrooms and attention to age bias in hiring and promotions. In addition, this presentation will examine responses that raise important considerations for integrating age inclusivity with other higher education DEI efforts.

AGE AS A DIVERSITY FACTOR IN HIGHER EDUCATION: INSIGHTS FROM DEI OFFICERS

Nancy Morrow-Howell, Natalie Galucia, and Michele Dinman, Washington University in St. Louis, St. Louis, Missouri, United States

This study described how DEI officers across universities/colleges currently think about AGE as a diversity factor; and identified strategies used to increase age-inclusivity. Data were generated through review of university websites, focus groups and one-to-one interviews with DEI staff. Findings suggest that age is acknowledged as a diversity factor but there is less action toward strategies to increase age-inclusion. Examples of initiatives include: training human resource staff to be age-neutral in hiring; eliminating birthdates and other years from applications; workshops on multigenerational workplaces and classrooms; presentations on ageism; and specific programs to support non-traditionally aged students. Some of the motivation to address ageism stems from legal mandates rather than being mission-driven. There is the concern that focusing more on age may require moving attention and resources away from other diversity factors. It appears that there is interest in elevating age as an important factor in DEI efforts.

STRATEGIES FOR CONNECTING AGE INCLUSIVITY TO DEI EFFORTS: A CAMPUS CASE STUDY

Carrie Andreoletti, and Andrea June, Central Connecticut State University, New Britain, Connecticut, United States

We’ve employed a multi-pronged approach to connecting our AFU initiatives, which promote age inclusivity, to our university’s DEI efforts. First, we asked our DEI office if they would collaborate. They agreed to link our AFU webpage to the DEI webpage and supported Ageism First Aid training for faculty and staff. Second, we participated in equity, justice, and inclusion (EJI) efforts on campus by ensuring that gerontology courses qualified for the EJI designation. This helps expand aging education across the curriculum as all students must take one EJI designated course. We also volunteered to speak about ageism to the first cohort of John Lewis Institute Scholars. Third, we partnered with our Center for Teaching and Innovation to offer programming on age inclusivity and generational diversity in the classroom. Taken together, these efforts have helped us to expand our reach and ensure that age is part of DEI conversations on our campus.

AGE-FRIENDLY MESSAGES AND IMAGES: A VIEW FROM HEALTH PROFESSIONS EDUCATION

Marilyn Gugliucci, University of New England College of Osteopathic Medicine, Biddeford, Maine, United States

The World Health Organization (WHO) report published March 2021 emphasizes that older adults are often subjected to a variety of negative stereotypes including helplessness, frailty, and child-like qualities. Ageism has both real mental and physical health consequences, including a decreased will to live, less desire to live a healthy lifestyle, an impaired recovery from illness, increased stress, and a shortened life span. Health professions education has a responsibility to prepare future providers in more than mindful physical care of older adults, it must address ageism that has proliferated negative personal biases that have triggered reduced overall health and quality of life. Preparation of lectures and learning materials in health professions education requires mindfulness of diversity as well as the implicit bias faculty may portray regarding age. This presentation will bring these nuances to light for consideration and as a reference to instill change.

SESSION 3810 (BIOLOGICAL SCIENCES INVITED SYMPOSIUM)

GENE REGULATION IN AGING

Chair: Alexander Mendenhall

The regulation of genes can both influence aging, and be influenced by the aging process itself. That is, the rate of aging can be altered by changing the gene expression program. And, the aging process itself causes changes in gene...
expression, including the ways in which genes are regulated. Understanding the consequences of differences in gene expression on aging rate, and the consequences of aging on gene regulation will continue to have profound impacts on our ability to manipulate the aging process. This symposium on gene regulation in aging will focus on how genes are regulated by the aging process and can be regulated differently to affect the aging process. We have an expert on the regulation of gene expression in the immortal germline and soma of the hydra, Dr. Celina Juliano. Dr. Roger Brent is an expert on the mechanisms of cell to cell variation in gene expression. Dr. Monica Driscoll is an expert on both the genetics of aging and gene expression changes with age. Finally, Dr. Alex Mendenhall’s studies are focused on understanding intrinsic (epigenetic) variation in the regulation of gene expression as a cause and consequence of aging. Together these experts will present their research as it relates to gene regulation and the aging process.

HOW THE SAME GENETIC PROGRAM RUNS DIFFERENTLY IN INDIVIDUAL ANIMALS TO AFFECT AGING AND DISEASE
Alexander Mendenhall, Bryan Sands, and Soo Yun,
University of Washington, Seattle, Washington, United States

Monozygotic human twins will age at different rates. The same is true for isogenic laboratory animals. Some of these differences in the rates of aging are caused by differences in the expression of genes. And, some of the differences in gene expression between isogenic individuals are caused by seemingly non-heritable, stochastic epigenetic differences. Here we discuss how differences in chaperone expression can influence aging and a model of Ras-driven neoplasia risk and survival in the model nematode Caenorhabditis elegans. We review evidence suggesting differences in epigenetic silencing machinery contribute to differences in chaperone gene expression. We suggest models for germline and somatic epigenetic regulation of chaperones. We discuss potential means of targeted epigenome modification, and potential implications for human health during aging.

MECHANISMS OF DEVELOPMENT AND REGENERATION IN HYDRA
Celina Juliano, Jack Cazet, and Abby Primack,
University of California, Davis, Davis, California, United States

Hydra vulgaris is a small and simple aquatic animal capable of whole-body regeneration and has negligible senescence. The entire animal, including the nervous system, is composed of about 25 cell types, and can regenerate from a fragment of tissue as small as ~300 cells. In addition, all cell types are continually renewed in the uninjured adult as part of normal homeostasis; every differentiated cell type is replaced approximately every 20 days, which likely contributes to its lack of aging. The remarkable features of Hydra are enabled by three distinct populations of stem cells that support the three lineages that make up the adult Hydra – the ectodermal epithelial lineage, the endodermal epithelial lineage, and the interstitial lineage (includes the neurons). A major goal of our laboratory is to understand the gene regulatory networks that control the specification of all Hydra cell types in the uninjured (homeostatic) state and then understand how injury triggers these differentiation pathways at unexpected locations during regeneration. Using high throughput genomics approaches such as scRNA-seq, ATAC-seq, and Cut&Tag, we have transcriptionally defined every cell type in Hydra and identified putative transcriptional regulators for each cell type. This includes the 11 neuronal subtypes that comprise the nerve net that spans the entire length of the Hydra body. We are currently leveraging these data to conduct functional testing of key putative regulators and to identify injury inputs into cell specification events during regeneration.

MISEXPRESSION OF GENES LACKING CPG ISLANDS IS A SHARED TRAIT OF MAMMALIAN AGING
Samuel Beck,
Boston University School of Medicine,
Boston, Massachusetts, United States

Changes in the 3-D architecture of chromatin are observed in various diseases and are also a hallmark of aging. Disruption of the nuclear lamina and associated heterochromatin are commonly observed in various aging contexts, including premature aging diseases, cellular senescence, and normative aging. Although these conserved structural changes have been reported for over two decades, their impacts on transcription and contribution to age-related degenerative changes remain unknown. By performing a large-scale computational analysis and experimental validation, here we show that genes lacking Cpg islands (Cgi- genes), which form heterochromatin when transcriptionally silent, are globally misexpressed in aged nuclei with disrupted chromatin architectures. We demonstrate that Cgi- gene misexpression is a common feature of mammalian aging and explains the molecular basis of various age-associated defects, ranging from loss of cellular identity and increased transcriptional noise to age-associated chronic inflammation. Our findings reveal that Cgi- gene misexpression is directly associated with age-related physiological deterioration, thus providing a novel biomarker of aging.

A SIMPLE ANIMAL MODEL OF EXERCISE REVEALS A MOLECULAR DETERMINANT OF LONG TERM HEALTH MAINTENANCE
Monica Driscoll,
Rutgers, The State University of New Jersey, New Brunswick, New Jersey, United States

At all stages of life, both dynamic gene expression changes and events that “lock in” particular programs that promote health and maintenance are critical factors in aging trajectories. We have a long-term interest in the fundamental biology of healthy maintenance, a topic that has led us to consider multiple facets of healthspan. A powerful whole-organism intervention with maintenance-promoting, anti-disease, anti-aging impact is exercise. The molecular and cellular mechanisms that mediate long-term systems-wide exercise benefits, however, remain poorly understood, especially as applies to “off target” tissues that do not participate directly in training activity. We are investigating the basic biology of exercise benefits using the simple 959-celled model C. elegans. We found that multiple daily swim sessions are essential for exercise adaptation, leading to enhanced expression of muscle structural genes and improved locomotory performance. Importantly, swim exercise training enhances whole-animal health parameters such as mitochondrial respiration and mid-life survival, increases functional healthspan of pharynx and intestine, and enhances nervous system health by increasing learning ability.