

Nathan Shock Centers Specialized Cores Summary

The Jackson Laboratory Nathan Shock Center		Core	Expertise	Core Leaders	Email
Website	Animal and Phenotyping Core		Provides unique and diverse animal resources to enhance research in the genetics of aging by developing and disseminating aging mouse models and resources	Gary Churchill	gary.churchill@jax.org
Gary Churchill, PI Ron Korstanje, PI	Data & Statistical Core		The overall goal of the JAX NSC Data and Statistical Core is to provide support for the management, quality control, analysis, and dissemination of data for JAX NSC projects	Gary Churchill	gary.churchill@jax.org
	Image Analysis Core		Develops machine learning tools to perform quantitative geropathology analysis of tissues. Evaluates, integrates and disseminates data relating to the genetics of aging from mouse, human and other organisms	Ron Korstanje	ron.korstanje@jax.org
	Research Development Core		Provides support for career development of junior faculty entering the field of basic aging biology or other investigators who wish to change career direction towards basic aging research	Ron Korstanje	ron.korstanje@jax.org
Minnesota Nathan Shock Center		Core	Expertise	Core Leaders	Email
Website	Administrative/Program Enrichment Core		Oversee and promote the cores of the MN NSC as well as host a yearly symposium on topics relevant to genome integrity, geroscience and the basic biology of aging	Paul Robbins Laura Niedernhofer	probbins@umn.edu lniedern@umn.edu
Paul Robbins, PI Laura Niedernhofer, PI	Research and Development Core		Administer and support annual pilot projects and research stimulus awards in addition to organizing geroscience-focused Omics Workshops in years 2 and 4	Paul Robbins Doug Mashek	probbins@umn.edu dmashek@umn.edu
	DNA Damage and Epigenetic Changes Core		Provides quantitative and reproducible mass spectroscopy approaches for accurately measuring oxidative DNA lesions and methods for measuring DNA methylation changes that occur following DNA damage	Natalia Tretjakova Peter Villalta	trety001@umn.edu villa001@umn.edu

Nathan Shock Centers Specialized Cores Summary

	DNA Damage Signaling and Repair Core	Provides CyTOF single cell analysis of DNA damage, DNA Damage Response (DDR) signaling and senescence at the protein level in single cells and measuring DNA repair capacity in primary cells	Xavier Revelo Elizabeth Schmidt	xrevelo@umn.edu ettinger@umn.edu
	Models of Genome Instability and Aging Core	Provides mouse and human cells and tissues deficient in different key DNA repair proteins as well as access to mouse models of accelerated DNA damage, senescence and aging for drug testing	Laura Niedernhofer Christina Camell	lniedern@umn.edu ccamell@umn.edu
Oklahoma Nathan Shock Center	Core	Expertise	Core Leaders	Email
Website	Administrative/Program Enrichment Core	Provides intellectual and organizational leadership and evaluates the Center's impact on aging and geroscience research programs locally and nationally, including through its Internal and External Advisory Committees; Oversees, manages and coordinates the execution of all NSC programs and activities, monitors progress, and ensures coordination between all Cores; Oversees the activities of the Geroscience Biorepository and the Geroscience Toolbox; Organizes and runs the Geroscience Webinar Series, Oversees the Geroinformatics Resource - Organizes the annual Oklahoma Nathan Shock Center Geroscience Symposium to discuss advances in the biology of aging and geroscience, promote collaborations, expand research networks, learn about funding priorities and opportunities, and serve as a forum for NSC Pilot Grant and K-series grant awardees, as well as early career investigators participating in our Pilot Programs and in Oklahoma NSC Mentorship Program of the Research Development Core	Veronica Galvan Benjamin Miller	veronica-galvanhart@ouhsc.edu benjamin-miller@omrf.org
Veronica Galvan, PI Benjamin Miller, PI	Research Development Core	Provides funded access to cutting-edge, transformative technologies to investigators in the aging and geroscience fields or starting a research program in these fields through General Call Pilot Awards, Translational Pilot Awards and Gene Discovery Pilot Awards; Provides mentoring, technical, and collaborative resources to promote the development of, or the transition to, an independent career in the biology of aging/geroscience through its Mentorship Program, K/F-Troop Workshops, and Grant Bootcamp Program; Ensures dissemination of knowledge while promoting participation of all investigators in aging/geroscience to benefit from core services and other research and career advancement activities of the Oklahoma NSC, and disseminates knowledge of aging/geroscience and the NIA NSC Program to the general public, both through its Outreach and Communications component	William Sonntag Ann Chiao	william-sonntag@ouhsc.edu ann-chiao@omrf.org
	Multiplexing Protein Analysis Core	LC-tandem MS with selective reaction monitoring (SRM) to measure protein panel abundance (antioxidant and mitochondrial proteins, proteins involved in β -oxidation, glycolysis, TCA cycle, branched-chain amino acid catabolism, others) in tissues and cells used in geroscience research; Development of new assays for additional proteins/protein panels as requested by investigators in any model system; Large-scale quantitative proteomics studies using data independent acquisition (DIA); Measures of protein turnover using deuterium oxide labeling	Michael Kinter Benjamin Miller	mike-kinter@omrf.org benjamin-miller@omrf.org
	Genomic Sciences Core	Genome-wide, base-specific analysis of DNA modification levels by nanopore sequencing; Whole mitochondrial genome sequencing for human, mouse, and rat (as well as other animal models, including invertebrates) to identify heteroplasmic variants; Absolute quantification of mitochondrial DNA copy number in human, mouse, and rat samples by digital PCR	Willard (Bill) Freeman	Willard-freeman@ouhsc.edu

Nathan Shock Centers Specialized Cores Summary

	Geroscience Redox Biology Core	Assays of redox status, e.g., GSH/GSSG, NADPH/NADP+, NADH/NAD+; Quantification of TCA intermediates (other metabolites available upon request); Assays of oxidative damage, e.g., F2-isoprostanes, and protein carbonyls; Mitochondrial function in cells and tissues (fresh or frozen); Free radical measurement by EPR spin-trapping	Kenneth Humphries	kenneth-humphries@omrf.org
	CRISPR Whole Genome Screening Core	Design and development of robust, cell-based, aging- and age-associated disease-relevant assays suitable for high-throughput screening of whole-genome single-guide (sg) RNA CRISPR libraries (human and mouse); Performance of high-throughput CRISPR whole-genome loss-of-function screens using human and mouse-arrayed sgRNA CRISPR libraries; Bioinformatic analyses, prioritization of gene candidates, and validation of genes identified	Matthew Hart	matthew-j-hart@ou.org
San Antonio Nathan Shock Center	Core	Expertise	Core Leaders	Email
Website	Administrative and Program Enrichment Core	Seminars, meetings and conferences; Weekly Aging Research Seminars, Journal Club and an annual Conference on Aging	Randy Strong Adam Salmon	strong@uthscsa.edu salmona@uthscsa.edu
Randy Strong, PI Adam Salmon, PI	Research and Development Core	Runs a pilot project program to enable investigators to take advantage of the expertise of the cores at the San Antonio Shock Center. Please email for details.	Peter Hornsby Jim Lechleiter	hornsby@uthscsa.edu lechleiter@uthscsa.edu
	Aging Animal Models and Longevity Assessment Core	Breed and maintain rodent colonies; Lifespan studies in rodents; Provide animal models for baseline pilot studies; Provide diets containing rapamycin and other drugs; Educate staff in animal husbandry and experimental design	Jim Nelson Adam Salmon	nelsonj@uthscsa.edu salmona@uthscsa.edu
	GeroMetabolism Core	Provide intellectual and instrumental/technical services to the scientific community on the selection and performance of functional assays in rodents that aim to increase our knowledge about mechanisms that control age-related changes in function at the tissue, organ, and whole body levels, in the context of normal aging and in relation to age-related diseases; Provide expertise and assistance to investigators with an interest in aging-related questions in the design and execution, as well as data analysis and interpretation on experimental measures	Xianlin Han Blake Rasmussen	hanx@uthscsa.edu rasmussenb@uthscsa.edu
	Pathology Core	End of life and cross-sectional pathology in rodents and other species maintained by the Aging Animal and Longevity Assessment Core; Quantitative morphometric analyses by 3D and 2D imaging; Develop a database and tissue archive of histopathology	Yuji Ikeno	ikeno@uthscsa.edu
	Pharmacology and Drug Design Core	Developing and validating bioanalytical assays for drugs and small molecules; Designing and creating usable, effective dosage forms; Measuring and confirming concentrations and stability of drugs in dosage forms; Quantifying and confirming drug concentrations in blood and tissues; Informing investigators on the process of dosage form development; Recommending pharmacologic approaches, such as level/timing of doses in studies; Proposing and justifying pharmacokinetic experiments if needed; Assisting in interpretation of data and preparation of papers and grants	Brett Ginsburg Daohong Zhou	ginsburg@uthscsa.edu zhoud@uthscsa.edu

Nathan Shock Centers Specialized Cores Summary

University of Alabama at Birmingham				
Core	Expertise	Core Leaders	Email	
Website	Administrative Core	Promotes the quality, services and activities the Research Cores; Evaluates; and enhances the impact of the Research Cores for the research community; Coordinates education, training, and outreach for the aging research community; Stimulates interactions and collaborations between the Center and the aging research community; Provides day-to-day administrative support and financial management for the Center; Organizes and supports seminars and symposia focused on the basic biology of aging; Offers research career development activities for graduate students and postdoctoral associates affiliated with the Center; Works with the Internal and External Advisory Committees; Manages the membership of the Center, in collaboration with the Internal Advisory Committee	Steven Austad Thomas Buford	austad@uab.edu twbuford@uabmc.edu
Steven Austad, PI Thomas Buford, PI	Comparative Organismal Energetics Core	Provides consultation in methods and study design, training, expertise and state-of-the-art instrumentation to facilitate research on the role of whole animal energetics and metabolism in aging; Learn about our full list of services and COEC fees	Tim Nagy Mickie Lynn Powell Daniel Smith, Jr.	tnagy@uab.edu mpowell@uab.edu dsmithjr@uab.edu
	Comparative Data Analytics Core	Provides consultation in study design, research proposal development, and data analysis, including traditional, specialized, and bespoke methods for scientists performing research on the basic biology of aging. CDAC also conducts high-level statistical investigations of secondary data to answer questions about the comparative biology and energetics of aging; See the complete list of Services here: https://www.uab.edu/shockcenter/cores/cdac/cdac-services	David Allison T. Mark Beasley Andrew Brown	david.allison@bcm.edu mbeasley@uab.edu awb1@iu.edu
	Comparative Mitochondrial Health Assessment Core	Offers state-of-the-art services to investigators to facilitate research and training on mitochondrial function and mitophagy as it relates to aging; Learn about our full list of services	JianHua Zhang Scott Ballinger	jianhuazhang@uabmc.edu scottballinger@uabmc.edu
	Research Development Core	Advertises broadly for proposals for Pilot and/or Feasibility studies in comparative energetics of aging from faculty in all disciplines; Administers a review system that ensures optimal use of the Center's research cores; Promotes interdisciplinary activities that leverage resources from a range of fields; Provides mentoring and support for the Pilot/Feasibility awardees; Identifies proposals exploring promising areas of research or seeking to address controversial areas in the basic biology of aging; Evaluates the Pilot/Feasibility Program success; Facilitates synergy and collaboration among awardees and other aging researchers	Thomas Buford John Hartman	twbuford@uabmc.edu jhartman@uab.edu
University of Washington Nathan Shock Center				
Core	Expertise	Core Leaders	Email	
Website	Administrative Core	Provides effective leadership, administration, and management of the Center; Supports the External Advisory Board of distinguished scientists who provide review and recommendations to the executive leadership of the Center and engages in outreach activities, including workshops, courses, lectures and symposia; Oversees and ensures dissemination of Center resources and research findings to the geroscience community and collaborates with other funded Nathan Shock Centers; Supports an inter-Nathan Shock Center Geropathology Research Resource (GRR) led by Dr. Warren Ladiges.	David Marcinek Jessica Young	dmarc@uw.edu jeyoung@uw.edu

Nathan Shock Centers Specialized Cores Summary

Dave Marcinek, PI Jessica Young, PI	Research Development Core	The Research Development Core provides support for researchers nation- and world-wide, most often junior faculty, to develop pilot data to aid in new project and career development. This is assisted by granting of competitive awards for pilot project support for studies in the basic biology of aging, using the key resources provided by our Resource Cores. Successful pilot projects will capitalize on the strengths of our four Resource Cores and awardees will be mentored by a senior investigator in the biology of aging. The Pilot Project program will be actively advertised and applications solicited nation-wide. The great majority of awards have been, and will continue to be made to investigators outside our region	Jessica Young Mariya Sweetwyne	jeyoung@uw.edu sandu@uw.edu
	Protein Phenotypes of Aging Core	Designed to provide the geroscience research community with access to state-of-the-art proteomics technologies. The Core has been at the forefront of developing technologies to perform large-scale targeted proteomics assays that generate near complete data matrices, accurate quantitation, and high reproducibility – even across multiple laboratories; The primary goal of the Proteomics Core is to apply these improved methods to studies of aging, to obtain accurate quantitative measurements of peptides from samples provided by its users, and to aid geroscience researchers in linking these high-dimensional data to biologically meaningful outcomes. In addition, the Core will apply new assays well- suited to aging as they are developed; This Core also works closely with the Metabolite Phenotypes of Aging Core, which shares some of the same facilities.	Mike MacCoss Judith Villen	maccoss@uw.edu jvillen@uw.edu
	Metabolite Phenotypes of Aging Core	Designed to provide state-of-the-art hardware and software tools to detect, identify and quantify aging-associated metabolites, to assist in the experimental design and statistical analysis of these metabolite profiles, and to develop novel analytical tools for more powerful analysis of metabolome studies; The Core has developed a variety of targeted metabolomic assays suitable for a wide range of studies relevant to the biology of aging, including detailed profiling of the NAD+ metabolome; This Core also works closely with the Protein Phenotypes of Aging Core, which shares some of the same facilities.	Dan Raferty David Marcinek	draferty@uw.edu dmarc@uw.edu
	Invertebrate Longevity and Healthspan Core	Assists investigators throughout the research community in quantifying a variety of longevity and healthspan measures in two of the major invertebrate model organisms: the budding yeast <i>Saccharomyces cerevisiae</i> and the nematode <i>Caenorhabditis elegans</i> . This is accomplished through direct collaboration, training and outreach, and the development and dissemination of new tools and technologies; New technologies we develop and disseminate include microfluidic tools for invertebrate aging studies and the WormBot, a robotic system for high-throughput survival and behavioral phenotyping in <i>C. elegans</i> ; We also work to develop chemostat-based solutions for obtaining age-matched pure populations of yeast for biochemical and cell biological experiments requested by Core users. The focus on yeast and worms allows us to provide services and technologies to a large number of external investigators and thereby have a correspondingly large impact; The data generated by this Core can often be correlated with high dimensional computational analyses and with the protein and metabolite phenotypes studied in the other Nathan Shock Center Cores; Invertebrate models are also highly accessible to junior investigators, and our Center pilot projects allow these investigators access to the full range of integrated services provided by the Center Resource Cores.	Maitreya Dunham Alex Mendenhall	maitreya@uw.edu alexworm@uw.edu
	Artificial Intelligence and Bioinformatics Core	Application of Explainable AI analytical approaches for mechanistic insights into aging biology; Application of XAI applications for large cohort datasets; Innovative approaches for analyzing single cell transcriptomics	Su-In Lee	suinlee@cs.washington.edu
Wisconsin Nathan Shock Center	Core	Expertise	Core Leaders	Email

Nathan Shock Centers Specialized Cores Summary

Website	Research Development Core	The goal of the Research Development Core is to expand the number of scientists engaged in projects on aging biology and to promote interdisciplinary and multidimensional research. We host a series of mechanisms to stimulate and facilitate innovative research in the basic biology of aging with a focus on metabolism and translation including Pilot Awards, fast-track Ideas Awards, Mini-Sabbaticals, and the Weindruch Scholar program.	John Denu Rozalyn Anderson	john.denu@wisc.edu rozalyn.anderson@wisc.edu
Rozalyn Anderson, PI Dudley Lamming, PI John Denu, PI	Energetics of Longevity Core	The Energetics of Longevity Core provides infrastructure and support for comprehensive longitudinal assessment of aging biology, focusing on metabolism and biochemical pathways implicated in age-related diseases and conditions. Features include the Metabolic Tracer and the Genetic Toolkit Platforms, Mouse Phenotyping and Surgery, Genome Editing and Animal Models, Small Animal Imaging Services, and access to the Flow Cytometry, Translational Research Initiatives in Pathology (TRIP), and Comparative Pathology Laboratories.	Dudley Lamming Alan Attie Jing Fan	dlamming@medicine.wisc.edu adattie@wisc.edu jfan4@wisc.edu
	Discovery & Integration Core	The Discovery and Integration Core facilitates mechanistic discovery in the basic biology of aging by providing access to cutting edge innovative technologies and supporting the development of tailored and advanced data analysis approaches. Features include the Molecular Profiling Service Hub, the Integrative Data Science Partnership to facilitate biostatistics, data analysis, and machine learning, and the Innovation Kitchen that annually solicits applications to address top technological barriers and implement strategic development.	Audrey Gasch Judi Simcox Tim Rhoads	agasch@wisc.edu jsimcox@wisc.edu timothy.rhoads@wisc.edu
	Translation & Application Core	The Translation and Application Core provides infrastructure and support for translational aging research. Features include the Nonhuman Primate Pipeline that facilitates translation of insights gained from rodent studies, the Liquid Biopsy Platform with rodent, nonhuman primate, and human capabilities to support translation and reverse translation, and the Geroscience Accelerator to facilitate translation to early human studies. Access to Small Molecule, Medicinal Chemistry, Pharmacology, and Flow Cytometry Services is also available.	Ricki Colman Joshua Lang Adam Konopka	rcolman@primate.wisc.edu jmlang@medicine.wisc.edu akonopka@medicine.wisc.edu
Upstate New York Nathan Shock Center	Core	Expertise	Core Leaders	Email
Website	Live Animal Resource Core	Provide advice on study design involving unconventional animal models for aging research; Provide access to live naked mole rats, Damaraland mole rats, and African spiny mice for use in biogerontological research; Develop projects with investigators interested in using these species relevant to biogerontological research; Provide investigators with custom-collected samples.	Andrei Seluanov	andrei.seluanov@rochester.edu
Vera Gorbunova, PI	Unconventional Invertebrate Models Core	Provide advice on the design of aging studies utilizing unconventional invertebrate models (eusocial wasps and ants); Generate genomic, proteomic, and metabolomic data sets from unconventional invertebrate aging models and make them available to researchers in the aging field; Provide investigators with tissue samples from aged invertebrate individuals when available; Develop cell lines from wasps and ants and once developed, provide to interested investigators.	Karl Glastad Floria Uy	kglastad@ur.rochester.edu floria.uy@rochester.edu
	Frozen Zoo Core	Provide advice on the design of comparative biology of aging studies. Assist with the statistical analysis of comparative biology data, including correction for confounding variables such as body mass and phylogeny; Provide frozen tissues and primary fibroblasts from 50+ species of mammals with diverse lifespans; Generate proteome data sets from non-standard model organisms and make them available to researchers in the aging field.	Vera Gorbunova	vera.gorbunova@rochester.edu

Nathan Shock Centers Specialized Cores Summary

	Comparative Omics Core	<p>Provide support in experimental design, sample preparation, and data interpretation, along with access to training workshops and symposia for proteomics studies tailored to aging research; Protein identification, quantitation, and post-translational modification profiling; Advanced methodologies focused on protein homeostasis, including assays for protein oxidation and turnover kinetics; Single-cell proteomics using state-of-the-art mass spectrometers (Orbitrap Astral and timsTOF Ultra), enabling high-sensitivity analysis of cellular heterogeneity in aging tissues; Provide support for multiomics integration for aging research. Exploration of the aging-related genome elements and their functions in regulating the proteome and metabolome. Support for pathway and network analysis using proteomics and metabolomics data in conjunction with other omics layers</p>	<p>Sina Ghaemmaghami Hongbo Liu</p>	<p>sina.ghaemmaghami@rochester.edu Hongbo_Liu@urmc.rochester.edu</p>
	Research Development Core	<p>Incentivize and facilitate innovative aging research projects by offering competitive pilot project awards; Promote training and mentoring in aging research across the training continuum including developing mentoring committees for postdoctoral fellows and junior faculty and overseeing undergraduate Summer Research Internships; Foster scientific exchange and collaboration by supporting short-term visits for training or experiments and travel to conferences</p>	<p>Kerry O'Banion</p>	<p>Kerry_OBanion@urmc.rochester.edu</p>