

Core Facilities & Other Resource Descriptions – Center for Transformative Research in Metabolism (“Center-TRiM,” “TRiM,” or “the Center”)

The UA Center for Transformative Research in Metabolism was established in 2020 with a mission to bring together existing research activities related to hibernation, metabolism, and metabolic health through multidisciplinary research teams with the long-term goal of discovering basic mechanisms to reversibly manipulate metabolic, homeostatic, or related processes and to develop therapies and diagnostics to treat metabolic disease such as sarcopenia, diabetes, obesity, and cardiovascular disease in order to promote healthy aging across the life span.

The Center is housed within the Institute of Arctic Biology with access to administrative services within the Institute as well as other centralized pre- and post-award services within the research infrastructure at the University of Alaska Fairbanks. The Center supports research within its mission by bringing together researchers within and outside of the University of Alaska for journal club and seminar presentations, collaborative projects, student mentoring, investigator mentoring, sharing of resources, and sharing of technical expertise. The Center supports one Administrative Core devoted to supporting research activities for Center faculty and two technical cores, the Health and Metabolism (HaMR) Core at UAF and the Advanced Instrumentation in Microbiome Studies (AIMS) Core at UAA. The Center offers funding for technique development, developmental projects and pilot projects building on the Center’s theme and resources.

ADMINISTRATIVE CORE (Admin Core)

The purpose of the Admin Core is to provide administrative support for research including fiscal management, assistance with reporting, coordination of Center sponsored journal clubs, invited speakers, professional development activities and workshops, public outreach and community engagement, and editorial and graphic services. The Admin Core facilitates mentoring by coordinating early-stage investigators with scientific advisors as well as providing support to mentors of TRiM’s investigators. TRiM’s External Advisory Committee, Translational Advisory Committee, Strategic Advisory Committee, and the President’s Professors Program provide focused guidance to ensure the long-term sustainability of the Center.

TRiM is guided by the following vision, mission, and value statements.

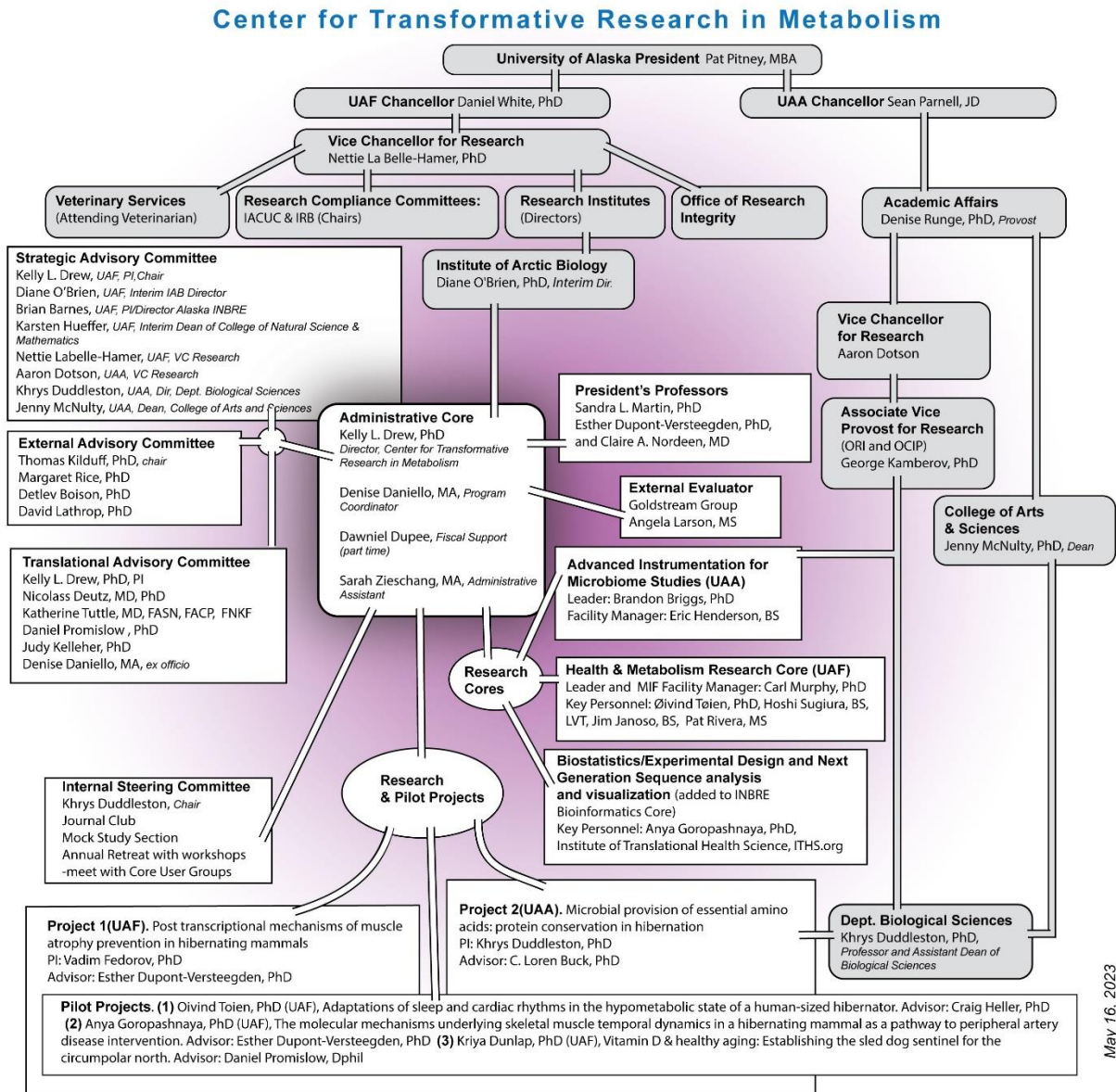
Our Vision: Translating hibernation research to improve human health.

Our Mission: To seek *fundamental knowledge* about the nature and behavior of hibernating mammals and the *translation* of that knowledge to enhance human health, lengthen life, and reduce illness and disability.

Our Values: “TRiM”

- **T for Team Science:** Multiple, diverse perspectives, and expertise empowers great and innovative science.
- **R for Respect:** Respecting each person for their unique perspective, expertise, and contribution to the overall effort.
- **I for Integrity:** Helping people to be the best at what they do best and keeping a high ethical standard.
- **M for Motivation:** Motivating oneself and others to do the job better than it has been done before to create a cycle of empowerment and accomplishment for both the scientific community and the Center.

Figure 1 shows the broad functional organizational structure of the Center for TRiM. The Admin Core supports ongoing and proposed research projects to bring strong research programs in hibernation and metabolic health together to enable vertical gains in understanding, prevention, and treatment of metabolic disease. The Admin Core serves as the 'glue' to unite the component parts of the Center to build a transformative research program in metabolic health.



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Figure 1: Organizational Structure of the Center for TRiM

A.1. Administrative support functions. Under the administrative umbrella of the Institute of Arctic Biology, the administrative home of TRiM, the Admin Core coordinates day-to-day activities required to meet the administrative and programmatic goals of the Center. The

Program Coordinator provides administrative support for the research cores, coordinates leadership and program specific activities including an External Advisory Committee and other advisory committee meetings, as well as invited seminar series and journal clubs. The Admin Core also coordinates professional development activities including grantsmanship meetings for pilot investigators, educational events, and TRiM's annual retreat. In addition, the Admin Core assists faculty and visitors with travel approval and reporting. The Admin Core supports administrative and scientific functions that expand existing Core services at UAF and supports the development of new services that do not yet have a research core home. This has led to expansion of the HaMR Core that now provides services and support of a veterinary technician, and microscopy and histology services and infrastructure. The Admin Core also coordinates a seminar series that serves as a forum for visiting scientists, described below, invited speakers, visiting collaborators and Center faculty, post-docs and students to share recent findings.

A.2. Leadership ensuring enhanced competitiveness in research and sustainability of the Cores.

External Partnerships for Specific Expertise and Scientific Supports leadership provided by the External Advisory Committee (EAC), Translational Advisory Committee (TAC), Strategic Advisory Committee (SAC), Internal Steering Committee (ISC), President's Professors and project specific external advisors/collaborators to broaden professional networks and increase opportunities to expand collaborations. Leaders in the fields of hibernation, metabolism, and metabolic health from inside and outside Alaska serve on the committees and in the programs described below to guide the research strategy.

The President's Professor Program recruits visiting scientists who are leaders in their respective fields to visit UAA or UAF during the year as scientific advisors. The program provides office space during the visit. The President's Professors Program supplements scientific expertise present within Alaska and expands our scientific network.

An *External Advisory Committee (EAC)*, comprised of 4 scientists with national scientific reputations in fields that are directly relevant to the scientific theme of the Center, evaluates the scientific progress of the Center for TRiM and offers advice on scientific matters to Director Drew and project researchers.

A *Translational Advisory Committee (TAC)* is comprised of established investigators with expertise to build opportunities for clinical research, especially as it relates to the translation of knowledge from the study of hibernating animals and metabolic research to improvements in overall health. The TAC meets by video conference twice a year and is involved in expanding translational research networks within and outside of Alaska and in advising on development of infrastructure and hiring new positions to develop clinical research capacity in Alaska.

A *Strategic Advisory Committee (SAC)* comprised of UAF and UAA administrators meets annually to review the Center's programmatic accomplishments and needs to enhance multi-disciplinary, thematic and sustainable research activities for the Center.

An *Internal Steering Committee (ISC)* comprised of the Research Core Directors, Core key personnel, Research Project and Pilot Project Leaders, and core users meets every other month. All committee input received from the EAC, TAC, and the SAC is incorporated through and discussed

with the ISC and used to guide strategic investment of resources that will grow the Center by establishing collaborative teams and Core resources.

Two Research Cores: The *Health and Metabolism Research Core (HaMR)* and the *Advanced Instrumentation in Microbiome Studies (AIMS) Core* carry out the objectives of the Center.

The HaMR Core provides research support for ongoing and future projects using the NMR, MRI/MRS and DXA in vivo imaging within the Molecular Imaging Facility; Animal Instrumentation for monitoring basic biological processes; Animal Support to assist with animal research needs, including performing surgeries and surgical training; and Microscopy/Histology maintaining several microscopes for a variety of imaging techniques relevant to diverse research projects. Dr. Murphy serves the dual role of Core Leader, overseeing management of the HaMR Core, as well as Manager of the Molecular Imaging Facility. Mr. Matt Seymour, Executive Officer (XO) for the Institute of Arctic Biology (IAB), provides fiscal assistance for day-to-day operations and development of the Core as a recharge center. Key personnel also include Øivind Tøien, PhD who manages the daily operations of animal instrumentation; Ms. Hoshi Sugiura, manager of Animal Supports, and Mr. Jim Janoso, Microscopy Manager with support provided by Ms. Pat Rivera, technician. The HaMR Core operates as a recharge center and offers internal awards for pilot and externally funded projects that grow capacity or serve the scientific mission of TRiM.

The *Advanced Instrumentation in Microbiome Studies Core (AIMS)* at UAA provides research support for microbiology focused on gut microbial ecology by offering advanced instrumentation and expertise to characterize microbial isolates and communities. AIMS provides a complete pipeline for characterization of microbial communities and isolates, combining multiple modules such as sequencing and bioinformatics, that researchers can plug into at any point along the pipeline or access the full pipeline to characterize either isolates or microbial communities. Dr. Brandon Briggs serves as the AIMS Core Leader with Eric Henderson as the Lab Manager.

The Center for TRiM also expands the scope of services provided by the Alaska INBRE Bioinformatics Core to include *Biostatistics/Experimental Design and Next Generation Sequence analysis and visualization*. The Center supports biostatisticians to assist investigators with experimental design, power analysis and biostatistical analysis. The Center also supports personnel to assist with functional genomic analysis using CLC bio–Genomics Workbench software for transcriptome assembly and RNA-seq and microarray data analysis. This analysis includes sequence read trimming, de novo assembly, consensus sequences annotation with blasting against different Gene Bank databases, mapping to a reference sequence, normalization of read counts, statistical analysis for obtaining differential gene expression, and evaluating the significance of differentiation.

A.3. Dissemination of results, data, and methods developed by the projects supported by the cores. Research project leaders are responsible for preparation and dissemination of results, data, and methods developed under their supervision, however, the Administrative Core assists with editing, review, submission, and other tasks required for manuscript submission, reporting, and dissemination. The Admin Core also works with project leaders to disseminate research findings through the Center's website and coordinates media announcements.

A.4. Leadership of the administrative core takes two forms: administrative and scientific.

A.4.1. Administrative Leadership. The Center's Director, provides and implements a plan for the effective management and productivity of the Center's activities with input from the EAC and other

advisory committees (the SAC, the TAC, and the ISC). The Director oversees the Administrative Core, supervises the Program Coordinator (PC), fiscal technician, and supervises key personnel in the HaMR Core. The Director oversees administration and allocation of funds with assistance from the PC, fiscal technician, staff members within IAB experienced in pre- and post-award grants management as well as the IAB Executive Officer.

The Administrative Program Coordinator (PC), Denise Daniello, plays a key role in advocacy and public outreach and in communicating the Center's accomplishments to stakeholders to promote the Center and make it responsive to stakeholder's needs. The PC also assists investigators with administrative tasks that would otherwise distract from research productivity. TRiM's *fiscal technician* works within the IAB post-award office to manage budgets for Projects and Pilot Projects, prepares monthly statements and projections, and reviews fiscal management of awards administered by UAA. TRiM's Admin Assistant assists the PC with administrative support functions.

A.4.2. Scientific Leadership-Committee Composition. Scientific leadership of the Center is a shared responsibility, in this case involving EAC and TAC members, President's Professors and other established NIH-funded advisors/collaborators named for each Project and Pilot Project. Director Drew works with the scientific leadership to develop and support the Center's mission and communicates advice from scientific leadership to investigators directly and through the Internal Steering Committee. TRiM's committees are described below.

External Advisory Committee (EAC): The EAC, the scientific advisory board for the Center, reviews program process, critiques scientific progress of the Center, advises the Center's Director on scientific and policy matters, and works with the Director to facilitate development of a sustainable, collaborative interdisciplinary research environment to support competitive R01 proposals and research programs. Members meet at least twice per year, once for a 2-day, in-person or hybrid meeting in Alaska and once by videoconference, due to the cost and time commitment for travel to Alaska. The EAC prepares a final report during its in-person meeting which is shared with the SAC, ISC, and the Center's Project and Pilot Project leaders. In addition, the EAC makes funding recommendations for the Center's pilot projects. EAC members include Drs. Tom Kilduff, EAC Chair, Margaret Rice, Detlev Boison, and David Lathrop.

Tom Kilduff, Ph.D., is the Director of the Center for Neuroscience at SRI International (formerly known as the Stanford Research Institute) and currently serves as the Chair for TRiM's EAC. Dr. Kilduff is an internationally known neuroscientist for his research on sleep/wake regulation, sleep disorders, and the biological clock. Government agencies, private foundations, and pharmaceutical companies have supported his research. He has been Principal Investigator on NIH grants from the National Institute of Aging (NIA), National Heart Lung Blood Institute (NHLBI), National Institute of Mental Health (NIMH) and National Institute of Neurological Diseases and Stroke (NINDS). Dr. Kilduff has authored/co-authored more than 200 published abstracts, scientific articles, book chapters and mentored over 20 postdoctoral fellows during his professional career.

Margaret Rice, PhD is Professor and Vice Chair for Research in the Department of Neurosurgery and Professor at the Department of Neuroscience and Physiology at the NYU Grossman School of Medicine. Dr. Rice's NIH-funded laboratory studies factors that regulate the release of dopamine, which is a key transmitter in motor and reward pathways of the brain. Dr. Rice is an investigator in the NYU Neuroscience Institute, a member of the Marlene and Paolo Fresco Institute for Parkinson's and Movement Disorders at NYU Langone and serves on the Scientific Advisory Board of the Parkinson's Foundation.

Detlev Boison, PhD, is Professor and Vice Chair of Research and Training at the Department of Neurosurgery, Robert Wood Johnson Medical School, and New Jersey Medical School, at Rutgers, The State University of New Jersey. He has a passion for translational research and seeks to translate fundamental mechanisms of biochemistry and energy metabolism into novel therapeutic approaches for the treatment of neurological conditions. Dr. Boison has maintained a rigorous research program on translational adenosine research and has been continuously NIH-funded since 2008. Dr. Boison has published 160 papers with an h-index of 53 and has delivered over 130 invited lectures.

David Lathrop, PhD, is the former Chief of the Heart Failure and Arrhythmias Branch in the Division of Cardiovascular Sciences at the National Heart, Lung, and Blood Institute (NHLBI) of the National Institutes of Health. At NIH, he conducted and managed an integrated basic and clinical research program to study normal cardiac function and pathogenesis to improve diagnosis, treatment, and prevention of heart failure and arrhythmias. Dr. Lathrop promoted opportunities to translate promising scientific and technological advances from discovery through preclinical studies to multisite and network clinical trials. During his professional career, Dr. Lathrop has been Principal Investigator on several research grants from the NIH/NHLBI, the National American Heart Association, the Norwegian National Heart Association, among others, and has authored/co-authored more than 100 publications.

Strategic Advisory Committee (SAC): In collaboration with the Center's Director, the SAC is tasked with developing strategies and identifying resources needed to retain investigators after they attain independent status and promoting success of Junior Investigators; optimizing administrative support functions for research productivity and compliance; and developing a strategy to support the hire of three new faculty to support translational research in metabolism for the Center's P2C. The SAC meets annually. Dr. Kelly Drew chairs this committee comprised of UAF and UAA administrators.

Translational Advisory Committee (TAC): The TAC meets twice a year by videoconference to advise the Center's Director on how to increase capacity for translational and clinical research in Alaska. TAC committee members include Drs. Kriya Dunlap, as Chair, and Katherine Tuttle, Nicolass Deutz, Judy Kelleher, Daniel Promislow, and Kelly Drew. Denise Daniello, MA serves in an ex officio capacity.

Kriya Dunlap, PhD, Pilot Project PI for *Vitamin D and Healthy Aging, the Sled Dog Sentinel for the Circumpolar North*, at UAF, chairs this committee comprised of strategic partners with knowledge, experience, and commitment to developing translational research in Alaska. Dr. Dunlap is a UAF Associate Professor of Biochemistry, Chemistry Department, Institute of Arctic Biology with an interest in developing sled dogs as a sentinel model for assessing the impacts of nutrition, exercise, and environmental stressors on health.

Katherine Tuttle, MD, co-directs the ITHS Regional Collaboration Program, an arm of the ITHS Community Engagement efforts. She chairs the Regional Advisory Workgroup to engage regional investigators and institutions in the five-state Washington, Wyoming, Alaska, Montana, Idaho (WWAMI) region to promote and conduct translational science.

Nicolas Deutz, MD, PhD, directs the Center for Translational Research in Aging & Longevity at Texas A&M University. He has published more than 600 papers in clinical nutrition and metabolism in animals and humans. Dr. Deutz's research focuses on (inter)organ protein and amino acid

metabolism using animals (mice, rats, pigs), healthy humans, and patients with various acute and chronic diseases, including (pre)diabetes, obesity, cancer, COPD, sepsis, liver and gut failure. Dr. Deutz has successfully competed for R01 and P01 funding as PI or co-PI since 2009 and has been supported by a variety of other federal and industry supported projects.

Judith Kelliher, PhD, is founder and Chief Executive Officer for the biotechnology company, Neuronascent. Her company focuses on developing small-molecule, non-invasive therapeutics to treat people suffering from chronic neurodegenerative disorders that lack any disease-modifying therapeutic options, such as Alzheimer's disease and related dementias.

Daniel Promislow, PhD, is Co-Director and PI, of the Dog Aging Project at the University of Washington, a NIH-funded nationwide long-term study of pet dogs. Per the University of Washington [website](#), *The Dog Aging Project seeks to identify the biological and environmental determinants of healthy aging in dogs and to identify ways to increase a healthy lifespan.*

The Internal Steering Committee (ISC): The ISC, with meetings occurring every other month, serves to facilitate scientific integration and synergy functions of the Center for TRiM. The major focus of meetings is to discuss input from advisors, share scientific progress and direction, and to shape Core services to sustain the cores and to best serve the research mission of the Center. ISC meetings help to foster interdisciplinary exchange of ideas between investigators and core service providers. The ISC provides input needed to adjust core services in a timely and responsive manner by sharing knowledge of emerging techniques through discussion of peer-reviewed literature and seminar presentations in weekly journal clubs at UAA and UAF. Further, the ISC fosters a collaborative vision for transformative research in metabolism and identifies gaps in expertise to be filled by newly hired Junior Investigators and collaborative partners. *An essential function of the ISC is to facilitate scientific integration and synergy of function.* Dr. Khrys Duddleston, PI for *Microbial Provision of Essential Amino Acids, Protein Conservation in Hibernation*, chairs this committee. She is Professor and Director of Biological Sciences at UAA. Other ISC members include TRiM's Research Core Directors, Core key personnel, Project and Pilot Project Leaders, and core users.

For more information about the Center for TRiM or the Admin Core, or to request a copy of this document in Word or google doc format, please contact:

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