

CORE FACILITIES

Fall Semester Newsletter

Happy fall, researchers!

We are excited to distribute our first campus-wide core facility newsletter to keep users up to date with new offerings, personnel, and events in our facilities. Our core facilities have been active this spring and summer preparing to bring several new systems and services online, training students, and hosting workshops to continue supporting the MSU research community in diverse ways.

As always, we appreciate your continued use of our facilities and look forward to another year of working collaboratively with you to perform cutting-edge research and providing distinctive, high-quality educational opportunities for students.

- Mary Gauvin, RED Service Centers Director



New Instrumentation & Services, pgs 3 & 4

The Montana Microfabrication Facility, Montana State Mass Spectrometry Facility, Social Data Collection & Analysis Services, and Imaging & Chemical Analysis Laboratory are bringing several new instruments and service lines online this summer and fall! Visit pgs 3 & 4 for more details.

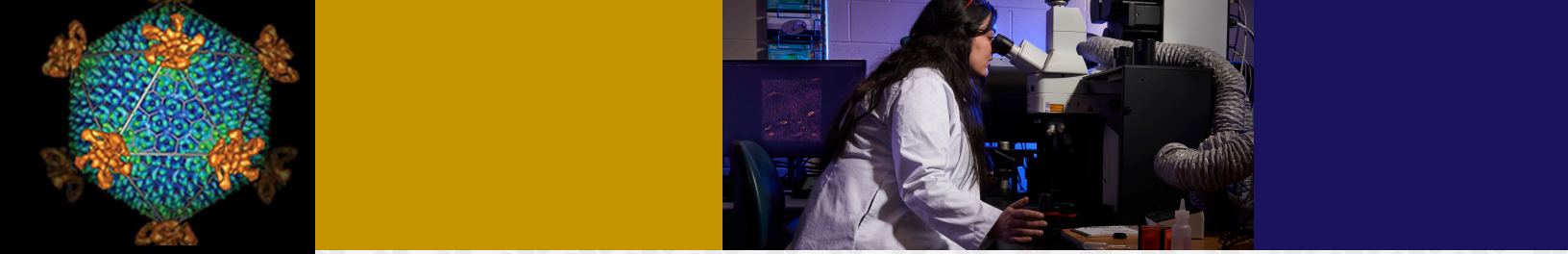
New Core Facilities Staff Spotlight, pgs 5 & 6

We are excited to welcome new faces to our RED Core Facilities staff this year. Visit Pg 5 & 6 to meet the newest members of our team, Dr. Amit Acharjee (MMF), Dr. Huma Yusuf (MMF), Dr. Sara Guenther (SDCAS), and Dr. John Hardin (Cryo-EM).

New Bioinformatics Core Facility

The Core Facility program is excited to start offering bioinformatics services to researchers starting this fall! The new facility will support researchers working with high-throughput biological data from consultation to data presentation. To learn more, visit **page 7**.





DISCOVERY

Research
& Economic
Development

STARTS HERE

Helping All of Montana Thrive with MSU Research Infrastructure

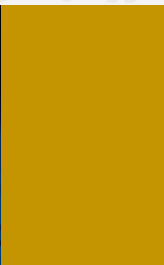
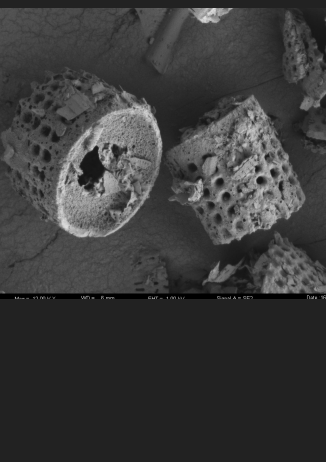
November
09 — Inspiration Hall

Join us for the second annual Centers, Institutes and Core Facilities Day, an event designed to showcase the advanced resources MSU has to offer to support cutting-edge research, commercial R&D, and education.

REGISTER TODAY!



Attendees will have the opportunity to win credits to use in any of our RED Core Facilities, as well as a chance to win a Proposal Enhancement Grant (PEG) kindly gifted by the Office of Research Development.



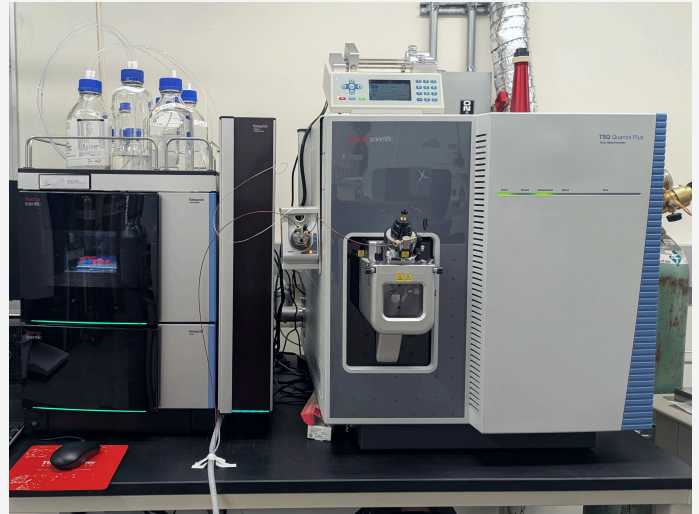
New Instrumentation & Services

Thermo Fisher TSQ Quantis Plus QQQ Mass Spectrometer

Montana State Mass Spectrometry Facility

The Thermo Fisher TSQ Quantis Plus is a triple quadrupole (QQQ) mass spectrometer that allows targeted analyses of biological, agricultural and environmental samples. The QQQ can provide high sensitivity for quantitative assays, and high sensitivity for targeted analytes in complex mixtures. This instrument is perfect for tracking "known" molecules confidently, and not discovery mode.

To learn more, please contact msms@montana.edu

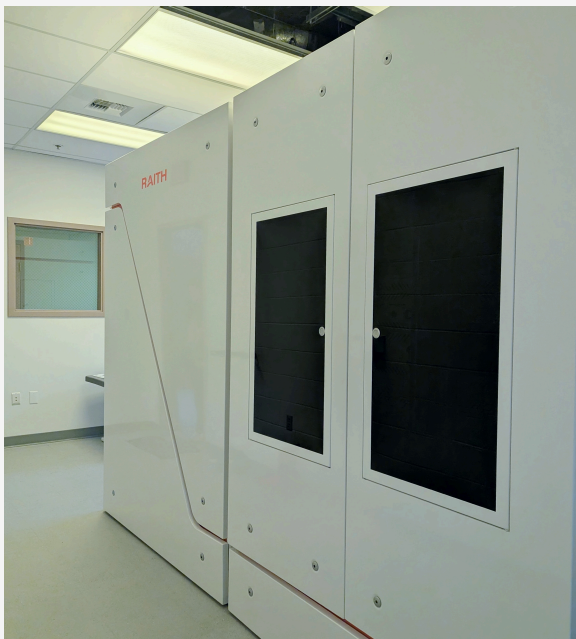


RAITH VOYAGER 6 Electron Beam Lithography Tool

Montana Microfabrication Facility

Acquired through Montana State University's Applied Quantum Center of Research Excellence (MSU QCORE) U.S. Air Force Research Laboratory grant, the RAITH VOYAGER 6 expands the Montana Microfabrication Facility's capabilities in advanced nanofabrication. The 50 kV electron-beam lithography system combines high-resolution, nanometer-scale direct-write patterning with a laser-interferometer-controlled stage for accurate alignment and efficient large-area fabrication. These capabilities enable rapid prototyping of next-generation quantum, nanoelectronics, and photonic devices while supporting researchers from academia and industry.

To learn more, please contact huma.yusuf@montana.edu



Program Evaluation Service

Social Data Collection & Analysis Services

Evaluation services include formative and summative evaluation design, needs assessment, data collection and analysis, reporting, and storytelling. Social Data's newest service line is an independent resource for grant-funded researchers and programs, community organizations, state and local governments, and commercial entities looking to demonstrate accountability and measure success. Evaluation services are customizable, client focused, and collaborative and additionally support data-driven decision making with tools for strengthening programs and measuring impact to serve clients in a competitive funding landscape.

To learn more, please contact sara.guenther@montana.edu

COMING SOON

With funding awarded through the National Science Foundation and the Murdock Charitable Trust totaling over \$1.1 million, the Imaging and Chemical Analysis Laboratory (ICAL) is preparing to receive a long-awaited small-spot photoelectron spectrometer (small-spot XPS) later this fall. The new system is expected to be installed in late October and producing data by the end of this year. This instrument replaces a 25-year old system that was retired in 2022.

PHI Genesis Small-Spot X-Ray Photoelectron Spectrometer (Small-Spot XPS)

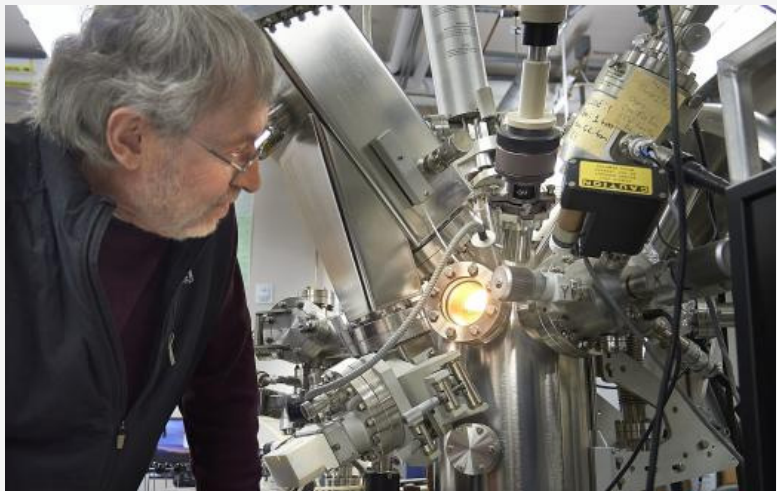
The PHI Genesis Multi-Technique Scanning Small-Spot XPS system with state-of-the-art features is expected to transform MSU's material analytical capabilities and expand the University's research capacity. XPS is a surface-sensitive technique that characterizes the elemental composition and chemical state of material surfaces with sub-nanometer depth resolution. Two important new features of the new XPS instrument stand out: 1) the new instrument will have 4-5 μm spatial resolution, a 200-fold improvement over the previous instrument, and 2) new sputtering technologies that will enable the XPS instrument to measure 'soft surfaces' including biological and polymer samples. Other features of the new instrument will include variable temperature capabilities (-100°C to 500°C), chemical state imaging, and four-probe assemblies to measure thin film resistivity.



"The XPS spectrometer is a foundational tool for any R1 university engaged in materials research," said Dr. Rob Walker, who led the charge to secure funding for the new system. "Not having this capability was a real gap in MSU's portfolio, and the interdisciplinary team effort to write this grant, with assistance from Drs. Recep Avci, Nicholas Stadie, Stephen Sofie, and Stephenie Ewing, will benefit research and education across the entire campus."

Demand for XPS analysis is perhaps even greater today, with the spectrometer advancing research activities at MSU and across Montana in quantum materials, energy storage and conversion, biomineralization and environmental science.

To learn more about the incoming XPS, please email ical@sympa.montana.edu



Recep Avci, director of ICAL looks at a sample inside the vacuum chamber of an X-ray photoelectron spectrometer in the ICAL facility. The instrument, used to study surface atoms on materials, will be replaced with a new version with 20 times the spatial resolution of the current XPS. MSU photo by Kelly Gorham.

NEW CORE STAFF SPOTLIGHTS

Amit Acharjee, PhD

Photonics & Materials Engineer,
Montana Microfabrication Facility

Amit graduated from MSU in 2025 with a PhD in Materials Science, where his research was focused on investigating the influence of surface and microstructural characteristics on the degradation behavior of metallic materials employing advanced materials characterization techniques. During this time, he also briefly served as a materials characterization expert in ICAL where he trained users, collaborated in interdisciplinary research projects and helped manage the daily facility operations.

Amit received his bachelor's degree in Materials and Metallurgical Engineering from Bangladesh University of Engineering and Technology (BUET). Before joining MSU, he worked as a Quality

Control Engineer at Bangladesh Steel Re-rolling Mills Ltd. (BSRM), one of South Asia's largest steel product manufacturers. With generous support through funding from the MPQA as part of the Integrated Photonics Ecosystem project, Amit now serves as a Photonics Equipment Engineer at the MMF and is working towards supporting current and new MMF customers to rapidly develop, assemble and test photonic integrated circuits (PICs) and strengthening the region's photonics infrastructure. The Integrated Photonics Ecosystem project is one of several funded through the Headwaters Tech Hub and the Economic Development Administration.



Huma Yusuf, PhD

Electron Beam Lithography Engineer,
Montana Microfabrication Facility

Huma earned her Ph.D. in Physics from The Ohio State University, where her research focused on molecule-based magnetic materials and their potential applications in quantum information science and engineering from a device-oriented perspective. Throughout her research career, she has developed expertise in micro- and nanofabrication, electron beam lithography, cryogenic measurements, electron paramagnetic resonance (EPR), microwave characterization, and device development. Her work has included the fabrication and characterization of hybrid magnetic-optical devices, superconducting microwave resonators, and electron transport devices based on perovskite oxide materials. With support through MSU's QCORE initiative, Huma now serves as the

Electron Beam Lithography Engineer at the MMF. In this role, she will oversee the facility's new RAITH VOYAGER 6 electron beam lithography system, develop fabrication processes, train users, and support researchers from academia, industry, and government laboratories. She looks forward to helping expand Montana's capabilities in nanofabrication, photonics, semiconductors, and emerging quantum technologies while strengthening the state's growing research and innovation ecosystem.



NEW CORE STAFF SPOTLIGHTS CONT.

Sara Guenther, PhD

Evaluation Scientist, Social Data Collection & Analysis Services (SDCAS)

We're excited to share that Dr. Sara Guenther is joining the Social Data Collection and Analysis Services facility team as an Evaluation Scientist and will be leading the facility's new line of evaluation services. Sara earned her Ph.D. in political science from UC San Diego and studied narrative risk communication with Dr. Liz Shanahan as a postdoc at Montana State University. She has extensive training in causal inference, survey design, and statistical analysis, and brings over a decade of experience using quantitative and qualitative methods in research and evaluation. She also has experience in facilitation and strategic planning and enjoys working across disciplines and sharing her expertise with teams interested in measuring impact. She joins Social Data after serving as an Evaluation Specialist for the National Oceanic and Atmospheric Administration, the U.S. General Services Administration, and the U.S. Office of Personnel Management. Sara began her scientific career as a staff researcher at the Scripps Institution of Oceanography whale acoustics lab and she is always happy to answer questions about whales :)



John Hardin, PhD

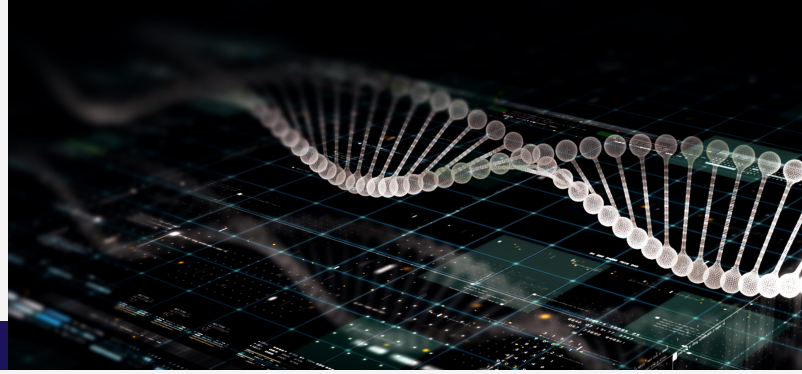
Cryo-EM Facility Manager,
Cryo-EM Facility

John first became interested in Structural Biology during his work at the University of Colorado, Boulder (PhD in 2007) where he studied Archaeal snoRNPs (small nucleolar ribonucleic acid/protein complexes). He continued his research with a postdoctoral position at the Stanford School of Medicine where he utilized X-Ray crystallographic techniques to solve the structure of a Dead-box helicase, important for ribosome biogenesis, bound to its target ribosomal RNA. Desiring still more structural biology experience, John next worked on the characterization of assembly pathways of the spliceosome (U4/U6 di-snRNP) with Kiyoshi Nagai at the Medical Research Council - Laboratory of Molecular Biology, in Cambridge UK. After meeting his wife and starting his

family in England, John then returned to the University of Colorado, this time to the Anschutz Medical Campus, where he has found great fulfillment in managing the X-Ray Crystallography core facility, and more recently, the Cryo-EM core facility. He now brings his experience to Montana where he is managing the Cryo-EM facility, happy to play a part in helping others reach their scientific goals. "I am thrilled to be a part of the fantastic work being done at MSU, and I already very much appreciate the great sense of community here. I hope to make meaningful contributions towards the support and development of a new generation of capable biomolecular explorers."



BIOINFORMATICS CORE FACILITY



Computational support for the full research lifecycle – from experimental design through publication-ready results

We are excited to welcome our newest core facility into our network this October! The Bioinformatics Core Facility will provide centralized computational expertise, ensuring support for researchers working with high-throughput biological data.

The new core facility will provide:

Consultation: Expert guidance at every stage of your project — before data collection and after analysis is complete.

- Experimental design and power analysis
- Sequencing platform and library prep selection
- Statistical approach and pipeline planning

Analysis: End-to-end bioinformatics pipeline execution using established and novel workflows.

- Quality control and preprocessing
- Reference-based and de novo assembly
- Differential abundance and expression analysis
- Pathway enrichment and functional annotation
- Custom pipeline development for novel data types
- Accessioned data submission to public repositories
- Data storage and backup

Data Presentation: Publication-quality figures, tables, and reproducible code.

- Manuscript-ready figures (R/Python)
- Methods/results text and citation support
- Code annotation, documentation, and repository archiving - including PI/investigative team as contributor
- Supplementary data formatting

Data types supported

DNA

- Amplicon sequencing (16S, 18S, LSU)
- Whole genome sequencing
- Shotgun metagenomics

RNA

- Bulk RNA-seq (differential expression)
- Single-cell RNA-seq (scRNA-seq)
- Metatranscriptomics

Metabolomics

- LC-MS / GC-MS / NMR data processing
- Untargeted metabolite profiling
- Pathway integration with omics data
- Statistical normalization and annotation

Ready to bring computational power to your research? Get in touch today to learn more!

Facility Director: Seth Walk
seth.walk@montana.edu

Facility Manager: Nick Pinkham
nicholas.pinkham@montana.edu

CORE SERVICE FEATURE

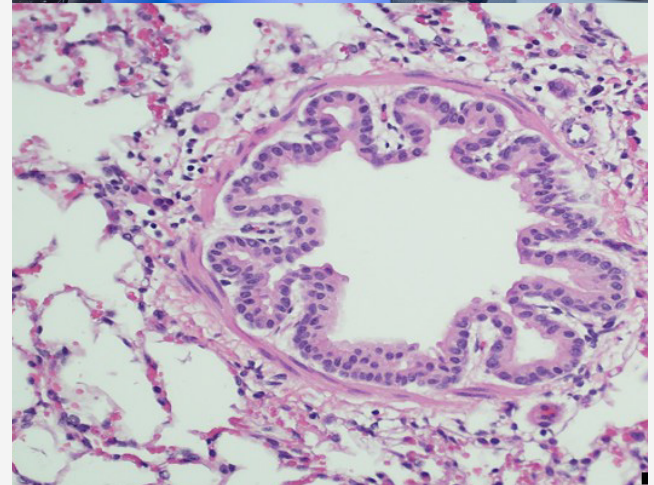
The Cellular Analysis Core (CAC), which is one of the recent additions to the Research & Economic Development (RED) Core Facility program at MSU and primarily supports flow cytometry, recently received a much needed upgrade in its histology laboratory – thanks to support from the local research community. “We are very happy to be offering state of the art, fully functional research instrumentation for histological sample processing to our users again.” says Dr. Diane Bimczok, the CAC director and professor in Microbiology & Cell Biology.

Montana research community supports histology lab upgrades in the Cellular Analysis Core

The first upgrade came two years ago, when the CAC entered the RED Core Facility program, and the histology instrumentation was moved from the Marsh lab building to the Health Sciences Building where most other CAC core instruments are located. However, at that point, most instruments were already 20 years old with failing parts and missing safety features. In an effort to better support MSU researchers and by collaborating with the MSU Alumni Foundation and core facility administration, the facility reached out to the local research community – with excellent success.

The Yellowstone Pathology Institute in Billings, MT, kindly donated two newer microtomes and an additional paraffin embedding station, which are now set up in the histology laboratory and enable two fully functional histology workstations. Thanks to outreach with the College of Agriculture, the CAC also acquired a practically new Leica cryostat and fully automated upright Leica DM6 microscope through a strategic relocation of equipment from the Northern Agricultural Research Center, where the instruments sat unused. The cryostat has updated safety features, an anti-roll plate for improved sectioning, and an adjustable sample head – which all contribute to a significantly improved user experience. Lastly, the new COBRE Center for Advanced Molecular Pathogenesis, which supports the CAC as part of the ABICA core, kindly committed funding for a brand new tissue processor and the facility will now be equipped with a new Leica TP1020 Automated Tissue Processor later this semester.

Moving forward, the CAC's histology lab can now support a wide range of sample types, from mammalian to plant tissue. If you are interested in using the new equipment or training in histological techniques, please reach out to the CAC facility manager Andy Sebrell (andysebrell@montana.edu) or Dr. Diane Bimczok (diane.bimczok@montana.edu).



First image: An undergraduate student slices tissue on a Leica microtome. Image by Doc Cravens.

Second image: Section of bronchiole in healthy lung tissue of a domestic lamb experimentally infected with *Mycoplasma ovipneumoniae* and treated with enrofloxacin. Hematoxylin and eosin stain. Image credit: Sobha Sonar

UPCOMING CORE FACILITY EVENTS

Metabolomics User Group

The Montana State Mass Spectrometry (MSMS) and Nuclear Magnetic Resonance (NMR) facilities are launching a new discussion series focused on bringing together researchers who use or are interested in learning more about mass spectrometry and metabolomics at MSU.

Meeting approximately once a month, the series will provide an informal forum to discuss practical aspects of mass spectrometry workflows, including experimental design, sample preparation, analytical methods, data processing, and data analysis. Some meetings will feature a specific topic or challenge, with periodic sessions focused more closely on metabolomics. The goal is to create a space where facility users can share experiences, troubleshoot workflows, exchange ideas, and learn from others across disciplines.

Researchers, graduate students, professors, and faculty of all experience levels are welcome to participate. Meetings will be open to the MSU community, with Webex participation available to facilitate involvement from collaborators and other interested researchers beyond campus.

More information about the first meeting, including the date, topic, and Webex details, will be coming soon. For questions, please contact Maggie Bailey (margueritebailey@montana.edu).

Imaging Cytometry Workshop

The Cellular Analysis Core (CAC) is hosting a workshop on **Nov 23-24** to train interested users on the facility's ImageStream imaging flow cytometer. Imaging cytometry is a high throughput method that combines flow cytometry and microscopy to analyze samples including bacteria, algae, cells, and other small particles. This workshop will involve everything from sample prep to instrument operation to data analysis, and is free to MSU students, staff and faculty.

Registration for the workshop will be available soon. For questions, please reach out to Diane Bimczok (diane.bimczok@montana.edu).

Evaluation Plans Don't Have to be Scary

Workshop hosted by Social Data Collection & Analysis Services and Office of Research Development

October 20, 10AM-12PM

Ever been spooked by a potential funder's evaluation requirement?

Master a critical yet often overlooked part of any grant proposal: the evaluation plan. Learn what motivates evaluation requirements, how evaluation adds value to your research agenda, and why a strong evaluation plan may be the difference between a funded and unfunded competitive proposal.

Dr. Sara Guenther, Evaluation Scientist at Social Data Collection and Analysis Services, will introduce workshop participants to the basic components of an evaluation plan and indicators of a strong evaluation plan.

"Ask an Evaluator" Office Hours with Sara will directly follow this workshop as an opportunity to discuss specific proposal ideas and evaluation questions.

[Register here](#) or contact ord@montana.edu with any questions about the event.



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Let us know at corefacilities@montana.edu so that we can record it!

As always, we thank you for properly acknowledging core facility services in your publications. Publications are a key performance indicator of a facility's research activity. When core facilities are applying for funding opportunities to support instrument upgrades, it is critical to include our research output in the form of publications. Additionally, facilities are often required to report publications that utilized core services to funding agencies post-award.

Acknowledging core facilities in your publications will help ensure that we continue to be here to provide training, instrumentation, and support in the future. [Learn more here!](#)

WHAT IS A RRID?

MSU Core Facilities have implemented the use of Research Resource Identifiers (RRID) to include in publications where our research services are acknowledged. *So what is a RRID?*



Research Resource Identifiers, or RRIDs, are unique identifiers assigned to resources such as cell lines, antibodies, and core facilities to improve transparency, reproducibility, and discovery of research.

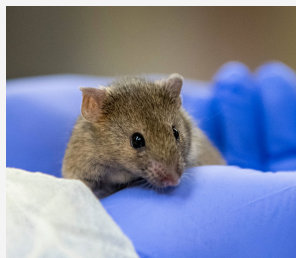


When citing instrumentation or services utilized in a MSU core facility, we are now requesting that you include the assigned facility RRID in your methods or acknowledgments section.



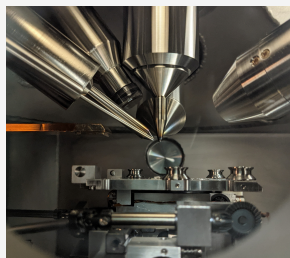
Including RRIDs will allow us to track our research output more efficiently, and to help meet rigor and transparency standards endorsed by major publishers. Learn more on our "Acknowledging Core Facilities" page today!

RED CORE FACILITIES



Animal Resources Center
arc@montana.edu
(406)994-6806

RRID:SCR_026351



Imaging & Chemical Analysis Laboratory
ical@sympa.montana.edu
(406)994-6806

RRID:SCR_026325



Bioinformatics Core Facility
nicholas.pinkham@montana.edu

RRID coming soon!



Montana Microfabrication Facility
andrew.lingley@montana.edu
(406)994-2518

RRID:SCR_026333



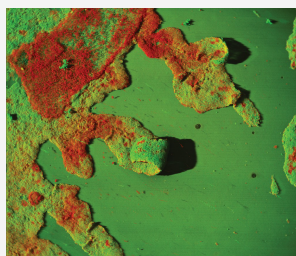
Cellular Analysis Core
andy.sebrell@montana.edu

RRID:SCR_026328



Montana State Mass Spectrometry Facility
msms@montana.edu
(406)994-7297

RRID:SCR_012482



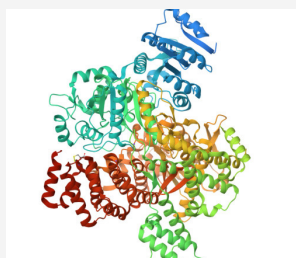
CBE Bioimaging & Analytical Core Labs
biofilmlab@montana.edu

RRID:SCR_026519



Nuclear Magnetic Resonance Facility
brian.tripet@montana.edu
(406)994-5649

RRID:SCR_026334



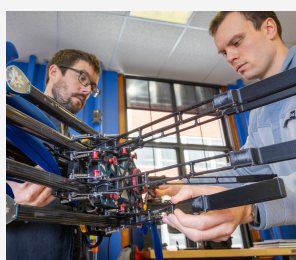
Cryo-EM Facility
cryo-em_facility@montana.edu

RRID:SCR_026324



Research Cyberinfrastructure
rci-support@montana.edu
(406)994-6806

RRID:SCR_026229



Geospatial Core Facility
geospatial@montana.edu
(406)994-4204

RRID:SCR_026332



Social Data Collection & Analysis Services
socialdata@montana.edu
(406)994-5205

RRID:SCR_026326