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Policies for the Yale Mechanical and Thermal Analysis Instrumentation Core (MTAIC)

The instruments supported by the Yale Mechanical and Thermal Analysis Instrumentation Core (MTAIC), which are housed in room 301 of Dunham Lab, represent a substantial investment and resource for the Yale research community. To ensure that these resources are available to all interested investigators and are performing at their optimum level with a minimum of down-time, the following policies have been established. These policies were developed by the MTAIC staff and MTAIC Academic Advisory Committee and are subject to periodic review and change.

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1. Prerequisites for New Users

a. Yale MTAIC is currently managed through an online Google calendar, even though it is expected to move to a web-based tool in the near future. On-site users will be given access to this booking calendar, through which they can apply for instrument access, reserve instruments, request services, and manage their accounts.

b. To be allowed access, users must have completed the *Laboratory Chemical Safety Training* required by the Yale Office of Environmental Health and Safety (EHS; see https://ehs.yale.edu/trainings/laboratory-chemical-training for details). Once completed, users must submit the certificates of the completion of EHS trainings to the MTAIC managing director to gain access to MTAIC facilities.

2. User Levels

1) A ***Trained User*** has received general training and is and is able to work independently on the particular instrument(s) on which he/she has been trained. A trained user can use the instruments independently at any time when the Yale MTAIC is open, including after hours.

2) A ***Superuser*** is a trained user that has received additional training from Yale MTAIC staff on specific add-ons to existing instruments. The processes and procedures involved in using such add-ons are often technically difficult and prone to errors that can potentially result in significant downtime of the instruments if not followed correctly, which is why a certain degree of experience is needed to achieve Superuser status.

3. Samples Allowed

a. Only non-hazardous samples are allowed to be examined on Yale MTAIC instruments, and users are responsible for making sure that their samples will not generate any hazardous byproducts. For example, it should be ensured before any experimental run is started that a sample introduced into the thermogravimetric analysis instrument will not generate hazardous gases like hydrogen sulfide or chlorine upon heating.

b. All Yale MTAIC instruments must only be used within the manufacturer-specified limits, which are listed in the instrument's user manual, and it is the responsibility of every individual user to check whether their experiment falls within instrument specifications. For example, if a machine's safe operating regime is limited to temperatures up to 100 °C, then the machine cannot be used for experiments above 100 °C (no exceptions). If in doubt, check with MTAIC staff to ensure your machine operating parameters are conforming with guidelines.

c. Similarly, all samples and experimental methods must conform to any other individual machine specifications and limitations, even if they are less obvious. For example, if a machine cannot be used in humid environments, then a sample that releases humidity should not be tested in the machine.

Users who violate these policies will be reported to the MTAIC facility director, their PI, and the Provost's Office, and actions including suspension of access may be taken depending on the severity.

4. Access

a. ***Only trained users of the Yale MTAIC*** as defined in Policy 2 are allowed to operate MTAIC equipment (***no exceptions***).

b. The Yale MTAIC is open 24/7 unless otherwise instructed by Yale MTAIC staff. Dunham Laboratory, and Dunham Lab room 301 where the MTAIC is located, are secured by an electronic card access control system. Access to the Yale MTAIC is granted following completion of proper training. Visitors or unauthorized users must be accompanied by an authorized user at all times when present in the Yale MTAIC unless an explicit exception has been approved by MTAIC staff.

c. During regular hours (9 am – 5 pm, Monday through Friday excluding holidays), Yale MTAIC staff is available to assist users as necessary. MTAIC staff might be able to assist users with method development or equipment operation on a case by case basis depending on availability and need. If such assistance would be desired, users must email staff well in advance (at least a week) for assistance. During after-hours, staff should only be contacted in case of an emergency such as hardware, software, or infrastructure issues that could potentially result in damage to the instruments if not attended to in a timely manner.

5. Sign up

a. All instrument access in Yale MTAIC must be reserved online.

b. ***Rolling sign-up –*** Instruments are available on a first-come, first-serve basis. Users can sign up for multiple sessions in advance up to 40 hours per week. If a user requires continuous use of the equipment for in excess of 40 hours per week, MTAIC staff should be consulted prior to making related arrangements.

c. Two types of sessions are available for signing up for each instrument: attended and unattended sessions. An **attended session** only applies to weekdays (8 am – 5 pm) where Yale MTAIC staff will provide assistance; such sessions will have to be arranged at least two weeks prior. An **unattended session** can happen at any day and time as the user will conduct experiments independently. In an unattended session, the user is fully responsible for monitoring progress of their experiment, although Yale staff may help if needed (***depending on time and availability***, see Policy 4c) and/or may provide technical support (only during regular hours on Monday-Friday).

d. Each user is responsible for finishing on time if another user has subscribed to measurement time right thereafter. If no one is signed up to use the instruments after your session, you can extend your time. However, you need to record the actual end time in the logbook accordingly.

6. Cancellation, Tardiness, Early Logoff, and Loss of Session

a. For multi-user facilities, cancellation, tardiness, and early logoff affect other users' experiments. Therefore, cancellation, tardiness, and early logoff caused by non-emergency circumstances are discouraged and may be subject to charge (see below).

b. ***Cancellation***: Reserved slots can be cancelled. If a slot needs to be canceled, please do so as soon as you know that you will not be needing it so that others can have a chance of booking that slot.

c. ***Tardiness***: If a user does not show up after 15 minutes from the starting time, the reservation may be lost, the slot is then open to other users to sign up. If no alternate user picks up the session, a written warning will be given to the original user. Users with a history of repeated no-shows (>3) might have their access suspended and will need to undergo re-training.

d. ***Early Logoff***: If a reservation is ended early due to an instrument issue or the experiment finishing early, the user will not be billed for the remainder of the booked time. Otherwise, early logoff is discouraged.

e. ***Instrument Down***: As customary for multi-user facilities, sessions lost due to unforeseen instrument down time and service will not be charged. Once the regular schedule resumes, users can book new slots.

7. Training

a. Training on the use of the instruments in the Yale MTAIC will be provided by staff. A trainee will need practice to gain sufficient knowledge and proficiency to receive certification. Any disputes regarding certification will be adjudicated by the MTAIC Director in collaboration with relevant faculty and administration officials.

- The initial training is charged at a flat rate of 150 dollars per instrument.

- Training will be provided to each user *by MTAIC staff only*. Certified users *cannot* train other users to use any equipment.

b. To receive training, users need to request training via email to Yale MTAIC staff. Their email request should also include their netID, their PI information, and a COA account for charging. Applications for training are assessed by Yale MTAIC staff and, if approved, training is scheduled based on the sequence of received applications and availabilities of trainee, trainer, and instrument.

c. For scheduled training, users expecting a delay of more than 20 minutes should notify the Yale MTAIC Director beforehand. Tardiness for >20 minutes will result in cancellation of the training and it will need to be rescheduled.

d. ***A completion of training*** is required for independent operation of each instrument. The user is then able to use the instrument within allowable instrument parameters (see Policy 3).

8. Sample Storage and Data Safety

a. Due to limited space and large user base, users should not store their materials (such as samples etc.) in the Yale MTAIC space (Dunham Lab 301); in addition, measured data should not be stored on MTAIC instrument computers for more than 30 business days (best is to transfer any measured data routinely at the end of each session). Yale MTAIC is not responsible for loss of data due to regular disk cleanup of old data.

b. Browsing other users' data without the owner's permission is prohibited. ***Users found accessing other users' data will be subjected to academic action***.

c. For maintenance and/or supervision reasons, the Yale MTAIC staff might need to access a user's data folder, but will keep the data confidential.

d. **Usage of Yale MTAIC computers**: Yale MTAIC computers are dedicated to data collection and analysis. Unauthorized modifications to software programs, including installations, uninstallations, upgrades, or downgrades, are prohibited. Web surfing is equally not allowed to minimize the risk of viruses and malware. Additionally, inserting non-authorized external file-storage devices (e.g., portable drives, personal USB drives, etc.) into Yale MTAIC computers is strictly forbidden. Users found breaking these rules will have their access suspended.

e. Raw data and other important experiment-related files should be transferred immediately after data acquisition to your own hard drive using dedicated Yale MTAIC-provided USB drives. It is the users' responsibility to archive the data on non-MTAIC storage devices in a timely manner to avoid possible data loss.

f. The priority is always to have enough storage space for upcoming sessions. Therefore, the storage space of the Yale MTAIC is only for short term data storage, and users must transfer the data to their own storage devices as soon as possible after measurements are completed (see Policy 8e). **Data older than <u>30 days</u> will be deleted to release space without prior notification of users**.

9. User Responsibilities

a. If users experience any hardware-related problems while operating the instruments, they must not attempt to resolve the problem by themselves. ***Instead, they must first close the instrument using proper shutdown procedures taught during training, then get support from the Yale MTAIC staff immediately***. In addition, they need to record the error details in the logbook so that Yale MTAIC staff can review these.

b. ***It is the user's responsibility to operate the instrumentation within the instrument limits*** *(see Policy 3).* Appropriate action including a possible suspension of access will be taken against users who knowingly operate the instruments outside limits either documented for the instrument or communicated to them by MTAIC staff. If such a violation occurs, an email regarding this violation will be sent to the user, their PI, the facility director, and the Provost's Office.

c. All usages of instruments must be recorded in the logbooks with details including name, lab, start time, finish time, and problems during the session.

d. Instrument unavailability (due to maintenance, hardware errors, etc.) will be indicated on the instrument calendar, with a note on the instrument, and through an email to all users of the instrument. Users that violate such instruction *will be suspended*. An email regarding this violation will be sent to the user, their PI, the facility director, and the Provost's Office. In addition, if such a violation would result in damage to the equipment, the user's PI may be charged for repairs.

e. Users must treat all resources in the Yale MTAIC with care (from tweezers to instruments) and cannot remove chemicals, instruments, or tools from the Yale MTAIC at any time. If MTAIC tools are found to be missing or damaged, users must report this to the staff *at the beginning of their session*. Although making mistakes is part of the learning process, *users may be responsible for repairing/replacing damaged tools/devices/instruments* when such damage is caused by obvious abuse.

f. Instruments must always be used within their specifications (Policy 3), and ***any use of add-ons to existing instruments must be cleared with Yale MTAIC staff prior to their use. Users found using permitted add-ons and attachments to instruments without proper authorization and/or outside previously discussed and documented limits will be suspended and reported to the facility director, the user's PI, and the Provost's Office.*** The user's PI may also be charged for instrument repairs if they were become necessary as a result of such violations.

g. All users must clean up their work areas after finishing their work, return all items to their original locations, and leave the Yale MTAIC in good and clean condition for the next user. *Users violating this policy on more than three occasions will have their access suspended for a period of 10 business days and will have to undergo re-training in order to be granted access to an instrument.* Each violation will be reported by Yale MTAIC staff to the facility director and the user's PI.

h. Spills of chemicals need to be notified and cleaned following Yale's standard policies.

i. If users repeatedly violate MTAIC policies and/or act with a lack of respect toward other users or Yale MTAIC staff, their access to the Yale MTAIC may be revoked.

10. Acknowledgement and Rates

a. Acknowledgements:

All users publishing data generated using MTAIC core facility equipment need to ***acknowledge MTAIC use explicitly***. An example of possible phrasing is shown below:

"The authors acknowledge the use and research support provided by the Yale Mechanical and Thermal Analysis Instrumentation Core for the XXX (DSC, TGA, DMA, Rheometer and Instron) experiments."

Please replace the XXX by whatever instrument(s) used (see bracket). Once published, please send a reprint of your paper to the facility's Managing Director, Dr. Amit Datye, for his records. This allows the facility to demonstrate its impact on research at Yale and subsequently to lobby for continued or expanded support by the Provost's Office.

In addition, if you have obtained significant support for carrying out your research, you may also want to consider including the appropriate staff member as a co-author in an eventual publication.

b. Rates: The internal instrumentation rates are shown in Table 1 below.

Table 1: Internal Unassisted User Rates (per hour)

Instrument	User Fee (/hr)
DSC	$15
TGA	$15
Rheometer	$20
Instron	$10
DMA	N/A

11. Feedback, Comments, and Concerns

For techniques and general issues, please direct feedback, comments, and concerns to Yale MTAIC Staff:

Amit Datye, MTAIC Managing Director (amit.datye@yale.edu)

Udo Schwarz, Facility Director (udo.schwarz@yale.edu)

If you have additional concerns or inquiries about Yale MTAIC, please direct them to Ben Myers, b.myers@yale.edu (Director of Research Cores).In addition, the Yale MTAIC Academic Advisory Committee members are listed below:

1. Dr. Udo D. Schwarz (MEMS) – udo.schwarz@yale.edu
2. Dr. Amit Datye (MEMS) – amit.datye@yale.edu
3. Dr. Micheal Mak (BME) - michael.mak@yale.edu
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