

## Project Goals

*Development of a user facility for mechanical and thermal measurements*

Yale is a top tier research institution but surprisingly without any user mechanical and thermal analysis characterization facilities.

Main issues –

- Lack of up to date equipment – current mechanical testing equipment available in teaching labs only (which cannot be used for research) is basic with most equipment being >10 years old.
- No dedicated staff to take care of the equipment, which causes equipment to break down frequently.
- Paltry resources compared to other most of our peers (and even most state schools).

## Resources Needed

*Characterization Equipment.*

*Dedicated and capable research support staff.*



## PI/Group

*Dr. U.D. Schwarz*

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## Link/Reference

<https://www.ccmr.cornell.edu/facilities/instruments/>

<https://www.ims.uconn.edu/facilities/#>

<http://jiam.utk.edu/laboratories.php>

## Current Approach

Since there is no user facility to study mechanical and thermal properties, most faculty have to pay user fees to other institutions or write proposals for user facilities at national laboratories, which takes time away from the actual research (including travel times) along with limiting the experiments that can be performed.

## How might a new mechanical and thermal instrument center help?

Currently: Ancient equipment with no support => Consolidating and upgrading equipment –

Most of current equipment at Yale is ancient and must be upgraded to the latest standard at the earliest. There are various pieces of equipment at Yale with different departments that have either been left over from faculty leaving or purchased by the department for teaching purposes. The common thread in all of these is that they are left without proper care and maintenance and consequently are often inoperable.

1. The differential scanning calorimeter (DSC) in MEMS, which is frequently used by students from five different research groups is approx. 15 years old. The manufacturer (TA instruments) will stop supporting that version of the product next year, which means when it breaks (which is inevitable), it cannot be repaired anymore, leaving many students without access to vital instrumentation.
2. The chemical engineering department has the same DSC (left by a leaving faculty). However, unlike in the MEMS Department where the Department constantly orders a person to repair and recalibrate the instrument, ChemE appears to lack that ability. As a consequence, the equipment is currently broken.

## What research would be enabled by an instrumentation development center?

This proposed user facility would support a wide user base of Yale faculty who need mechanical and thermal properties measurements.

Example: A nanomechanical tester needed by at least six Yale faculty in different schools (Medicine, Engineering & Applied Sciences, FAS) and six different departments to successfully complete currently federally funded research is urgently needed (have currently to use outside user labs).

## What difference can it make to your research and the training of personnel?

Besides supporting a variety of currently federally funded research at Yale, this facility will train Yale undergraduate and graduate students in the use of advanced equipment and expose them to the cutting edge of science.