

Advanced Instrumentation Development Center (AIDC) in the Physical Science and Engineering Building (PSEB)

A Whitepaper based on input from the Instrumentation Task Force and AIDC Committees

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Summary

Instrumentation development was identified as one of the cross-cutting initiatives in the [University Science Strategy report](#). In February 2020, Provost Strobel also announced the [Physical Science and Engineering Building \(PSEB\)](#) planning.

Following the Yale Days of Instrumentation in [2018](#) and [2020](#), Provost Strobel tasked an Instrumentation Task Force to consider how the university might provide new, innovative, physical space and resources to support instrumentation development across disciplines and campus as part of the planning of the Physical Science and Engineering Building (PSEB) complex. This Task Force formulated a vision for what is now named the Advanced Instrumentation Development Center (AIDC) within the PSEB: The mission of the AIDC is to facilitate cross-cutting ideation and innovation as a specialized hub of technical facilities; a resource for engineering expertise; an institute for education and training programs; and a center for community-building efforts, connecting researchers and staff across campus.

As a hub for instrumentation development, the AIDC will be a destination for staff, researchers, and faculty engaged in developing instrumentation and advanced technologies, fostering interdisciplinary initiatives across campus and beyond. With a broad user group, composed of members with extremely diverse interests, the AIDC will support a variety of initiatives, enabling realization of novel and cross-cutting ideation and fabrication activities, including those in quantum science, planetary solutions, and beyond. One example is that the AIDC will offer the opportunity to connect instrumentation solutions with the latest developments in data collection, high-performance computing, and data science, forming direct connections between hardware and analysis. This integration will provide the AIDC with a unique role in the context of other science initiatives on campus, increasing Yale's leadership at the nexus between hardware, computing, and data science.

Goals

To realize the vision outlined above the AIDC will serve several specific program goals. They include:

- Expand technical support for instrumentation development on campus building on the technical shops and the Advanced Prototyping Center at Wright Lab, and add key capabilities, such as an electronics and data acquisition core.
- Serve as a centralized instrumentation and engineering facility and intellectual “hub” for instrumentation development for the entire campus community
- Build cross-cutting synergies between different disciplines and locations on campus and facilitate connections within the research and instrumentation development

community, akin to that which the [Center for Engineering and Innovative Design \(CEID\)](#) creates for our undergraduate students.

- Provide a framework to better organize, coordinate, and support instrumentation efforts on campus.
- Provide the Yale instrumentation community access to specialized expert advice and hands-on training opportunities in support of instrumentation development.
- Provide enhanced support, professional development, and career opportunities for professional staff scientists.
- Be a visible sign for world-class physical sciences at Yale.
- Connect, leverage and build upon existing unique facilities at Wright Lab and other instrumentation centers across campus.
- Develop existing intellectual connections and explore new connections including but not limited to instrumentation and data science, quantum sensing, Yale planetary solutions project, increasing connections with Brookhaven National Laboratory as well as industry partners
- Support the continued evolution of scientific and technical work at Yale and help the University remain at the forefront of scientific discovery.

Capabilities, Cores, and Spaces

To support these program goals, AIDC will add key capabilities, cores and specialized spaces to the landscape of research infrastructure at Yale including:

- An electronics development and data acquisition core
- Expansion of the prototyping capabilities in the Advanced Prototyping Center (APC)
- R&D and assembly spaces for instrumentation projects
- Interaction, seminar, and workshop spaces for an instrumentation development program
- Outreach space and programs
- Program/project management to support projects from conception to completion and to support the development of large, project-based proposals
- A diversity of expertise to enable new and unique opportunities for Yale students and researchers
- Expanded programming, creating new educational opportunities for researchers, and students at all levels

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