UNIVERSITY of WASHINGTON

Advanced Composites Center

THE ADVANCED COMPOSITES CENTER PROVIDES A ROBUST INNOVATION ECOSYSTEM FOR INDUSTRY AND ACADEMIA TO ADVANCE THE FIELD OF DATA-BASED METHODS FOR COMPOSITES MANUFACTURING

A VISION FOR THE FUTURE OF COMPOSITES

The Advanced Composites Center (ACC) will be the leader in using data-based methods and machine learning for developing composite manufacturing methods and address issues such as high-rate, cost-efficient thermoset and thermoplastics, reducing the environmental footprint of the aerospace industry and training the work-force of the future.

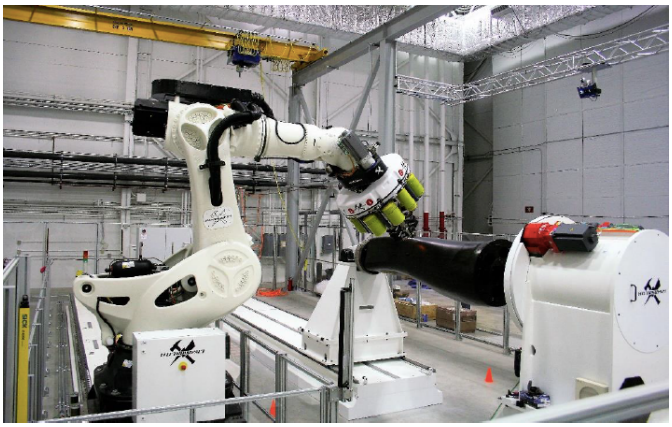
Leveraging industrial partnerships, the ACC will transform fundamental research into practice, and feedback successful technologies back into education and work-force development.

The center will lead and be a national magnet for design, manufacturing, evaluation and certification of novel energy-efficient lightweight composite systems. The outcomes of the ACC include:

- **research**
- **workforce education**
- **educational outreach**
- **professional technical training**
- **commercialization**

A MULTIDISCIPLINARY EFFORT

The ACC will catalyze translational research by bringing together faculty teams from across the college and university, such as Materials Science and Engineering, Mechanical Engineering, Astro & Aerospace Engineering, Chemistry, Applied Mathematics, the e-Science Institute, and the Boeing Advanced Research Center, BARC.



The ACC will include educational efforts (for both undergraduate and graduate students) and research efforts through BARC as well as the Federal Aviation Administration (FAA) funded Center of Excellence for Advanced Materials in Transport Aircraft Structures (AMTAS).

A SPACE FOR RESEARCH & EDUCATION

The ACC will be housed in a 16,000 sq. ft. UW facility available at Sandpoint (Magnussen Park Building 5A).

> **16,000 sq. ft.** for Research & Education
> **5** departments
> **3** research centers

The space will have demonstrator- capable manufacturing floor, classroom and presentation space, graduate student suite, fully-equipped conference room, technical office, BARC engineering office, and (shared) industry-user office. The center will enable cutting-edge research, validation and acceleration of composite materials, structures, software and production. Additionally, the center will be available for composites educational and outreach efforts.

FACILITIES & RESOURCES

The ACC facility equipment will be available as a cost center for other UW and external users. Moreover, sufficient experimental resources will be available through the AMTAS center, which will be part of the ACC. The equipment includes an automated fiber placement system, autoclaves, ovens and hot presses for specimen fabrication, router and fabric cutters for fabricating the conducting embedded layers; various machine tools such as molding machines and CNC machines, electromechanical test frames for static tests and servo-hydraulic test frames for cyclic fatigue tests; and the associated test frame accessories such as load cells, and data acquisition systems.

> **AFP**: Automated Fiber Placement system for thermosets and thermoplastics

> **2 autoclaves**: 400°F, 100psi, 3’ dia. x 8’ long and 2’ dia. x 3’ long. 3 vacuum ports

> **1 Heated-Platen Press**: Capacity: 50 ton. Platen size: 609 x 609 mm, Temp: up to 650° F

> **2 Blue-M lab ovens**: Temp. range: ambient to 480°F, L x D x H = 20”x20”x20”, 35”x30”x48

> **1 CNC Fabric Cutter**: Max fabric dimensions: 62" x 94"

> **1 CNC Router:** Materials cut: foam molds and plugs, and carbon fiber pre-preg and fabric patterns. Table dimensions: 60" x 102"

> **Test frames:** Capacities of 22 up to 56 kip. Accessories: Bluehill v2 control and data acquisition software, Pneumatic grips, tensile wedge grips, compression platens, 3&4-point bend fixtures, Laser extensometer, clip-on extensometers (axial and transverse), IITIR compression fixture (ASTM D3410), Iosipescu shear test fixture (ASTM D5379), Laminate Bearing Strength Fixture (ASTM D5961), Boeing Open-Hole Compression Fixture (ASTM D6484). Vishay System 5000 signal conditioning and data acquisition systems; 20 channels for strain gauges, thermocouples, and ±10V analog signals

> **VIC-3D:** various 3D DIC systems composed of high speed cameras (up to 82,000 frames/sec), strain resolution: 0.005% microstrain or better, strain range: 0.005%-2000%

> **Droptower:** Energy range: 0.59-1800J, Impact Velocity: 0.77 - 24 m/s, Drop weight: 2-70Kg. Impactor: 16 mm diameter (hemispherical), Environmental chamber: -70°C to +150°C. Anti-rebound system

CONTACTS

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