University of Tennessee, Knoxville
(Knoxville, Tennessee)

Left to Right:
- *3D printed replica Shelby Cobra made at DOE's Manufacturing Demonstration Facility at ORNL*
- *AIME 3D printed house and vehicle additive manufacturing integrated energy system*
- *3D printed tool (world record) for Boeing*

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Area of Expertise: Government-University-Industry-National Lab Collaboration, Rapid Innovation, Tech to Market

Major Takeaways: University of Tennessee, Knoxville

Event Overview:

- May 23rd with 150 attendees from seven states (TN, AL, FL, GA, MS, NC, SC), with six panel discussions targeting industry, university, entrepreneurship and graduate education, technology and regional capabilities, and pathways to commercialization.

Key Takeaways:

- Current Regional Innovation Ecosystem
  - **Strong technology-based ecosystems** in (1) advanced manufacturing and automotive, aerospace and land-based turbine sectors, (2) grid stability, grid cyber security, scaled grid distribution, power electronics and regional energy suppliers, (3) biomaterials and carbon management strategies and industry, (4) nuclear energy, and (5) smart cities and the built environment.
  - **Accelerated Collaborations**: two DOE-AMO NNMIs (IACMI for composites manufacturing, PowerAmerica for wide band gap power electronics); two DOE hubs (BESC for bioenergy and CASL for nuclear energy).
  - **National Laboratories** (ORNL in TN, SRNL in SC, Jefferson Lab in VA) including many **SC-supported specialized user facilities** (e.g., materials characterization, high performance computing, transportation, manufacturing, carbon fiber).
  - **Engaged Universities** with strong records of R&D, commercialization, and collaboration.
  - **Energy utilities** (e.g., TVA, EPRI, Southern, Duke, FPL, EPB) and **collaboratories** (e.g., NEI, EWI, SRI, RTI, ORAU).
  - **OEMs** (e.g., Boeing, Lockheed, GM, VW, BMW, Volvo, Honda, Nissan, Daimler, Mercedes Benz, GE, Siemens, MHI, Hitachi, Alstom, Mitsubishi, John Deere, Cummins, ABB, Westinghouse), **their supply chains** (e.g., Eastman, DuPont, BASF, PPG, Alcoa), and **SMEs** (e.g., Local Motors, Cincinnati Inc., Ingersoll, MVP, Techmer).
  - **Tech to Market:** Strong connectivity (e.g., Council on Competiveness, Brookings, Innovation Crossroads, Triangle Angel Partners, Nashville's 36/86 conference, Cleantech Open Southeast).
  - **International:** CRADAs and MOUs (e.g., ARCAM AB, Concept Laser GmbH, Boeing AMRCs, Fraunhofer).

- **Building a Broader Ecosystem**: Generally Southeastern (e.g., TN, IN, OH, PA, WV, KY, VA, NC, SC, GA, AL, FL, MS, LA)

Major Takeaways: University of Tennessee, Knoxville (continued)

Key Takeaways (continued):

- **Opportunities:**
  - **Excellent existing government-university-industry national lab collaborations** to leverage.
  - **Supportive industries** and their supply chains.
  - **Supportive State government**.
  - **Supportive investment community** and **innovator** (tech to market) **ecosystems**, NGOs.

- *Priorities* (**Clean Energy R&D Focus Areas**):
  - *Advanced manufacturing* for light-weighting in the vehicles and transportation sector (**Vehicles and Transportation**).
  - *Integrated grid management* and new *power electronics* (**Electricity Grid**).
  - *Bio-derived fuels* **and** *Carbon Conversion* (**Bio-Based Fuels and Materials; CO$_2$ Capture, Utilization, Storage**)
  - *Nuclear energy*, advanced manufacturing and materials (**Nuclear Energy**).
  - *Sustainable smart communities* with net neutral energy and water consumption, resilient infrastructure (**Industry and Buildings; Energy Storage; Renewables**).

- **Challenges:**
  - Need for improved business processes around speed of connecting industry to science & technology. Building upon existing models such as IACMI are essential for improving the speed of business.

- **Next Steps:**
  - Directed strategic collaborations tied to regional innovation needs, workforce needs, and especially innovation accelerators and private/foundation/investment efforts in the clean energy technology space.