TECH TRANSFER

Realizing Practical Benefits from Basic Research

A wide range of technologies are developed while conducting Jefferson Lab's basic research mission.

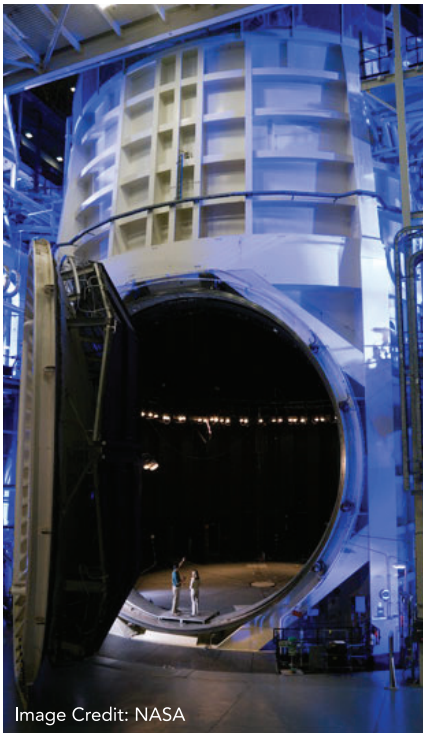

Image Credit: NASA

Jefferson Lab fosters innovation through basic research to benefit society.

INTRODUCTION

Jefferson Lab's primary mission is to conduct basic science research in the field of nuclear physics. However, the lab also looks for innovative ways to transfer technologies, leveraging investments in federally funded scientific research by engaging universities and industry partners in moving those technologies to the market.

Technology transfer involves many things – including technical assistance to address a problem, use of unique facilities, licensing of intellectual property, personnel exchange, and cooperative research agreements. Jefferson Lab's Technology Transfer activities must ensure fairness of opportunity, protect national security and promote national economic interests without competing with the private sector. Our scientists and engineers have created a suite of technologies addressing national challenges; these include medical imaging, biofuels, nanomaterials, cryogenics, and advanced accelerator concepts for research, isotope production and energy applications.

TECHNOLOGIES FOR TODAY AND TOMORROW

Jefferson Lab scientists and engineers have generated more than 400 invention disclosures and over 150 patents, with technologies licensed to more than 20 companies for development. The majority of Jefferson Lab's patents fall

into four primary categories: Nuclear Imaging, Cryogenics, Advanced Accelerator Technologies, and Nanomaterials.

NUCLEAR PHYSICS DETECTORS BENEFIT FIELDS FROM CANCER DETECTION TO BIOFUELS

Novel high energy particle detector technologies developed at Jefferson Lab have been leveraged to build application-specific radioisotope detectors and imaging cameras for both biomedical and ecological research applications. Its application to cancer detection in humans spawned a start-up company. Photosynthesis studies conducted in plants could be used to increase food production and aid production of biofuels.

CRYOGENIC ADVANCEMENTS AID RESEARCH ON EARTH AND IN SPACE

Jefferson Lab is a leader in cryogenics technology and the Jefferson Lab–developed "Ganni Cycle" has revolutionized the way helium cryogenic (refrigeration) plants work. This technology has yielded significant savings at the Relativistic Heavy Ion Collider in New York, and the Spallation Neutron Source (SNS) in Tennessee. It was also used to enable testing of components for the James Webb Telescope at NASA.

ACCELERATORS BENEFIT SCIENCE AND SOCIETY

Jefferson Lab is a world leader in superconducting radiofrequency (SRF) accelerator technologies critical to

Jefferson Lab scientists and engineers hold more than 150 patents.

research in high-energy physics, nuclear physics, nuclear astrophysics, life sciences and materials science. Jefferson Lab's leadership in this field has benefited many other DOE labs and projects, including SNS in Tennessee, the Facility for Rare Isotope Beams in Michigan, and SLAC National Accelerator Laboratory in California. In addition to these benefits to science, advanced accelerators also have applications with more immediate and broad-based societal benefits, such as energy and isotope production.

NANOMATERIALS: FROM BIOMEDICINE TO NUCLEAR SHIELDING

Boron Nitride Nanotubes (BNNTs), produced in collaboration with NASA Langley Research Center and the National Institute of Aerospace, is a material with numerous applications in biomedical, ceramic composites, fire retardant cabling, electrically insulating components, piezoelectrics, polymer composites, and radiation shielding. A boron-based material developed at Jefferson Lab provides neutron shielding for research, nuclear power and radiation therapy.

Advanced accelerator structures such as this crab cavity have multiple applications.

PARTNERING WITH JEFFERSON LAB

Jefferson Lab is actively involved and engaged with local, state, regional and DOE technology transfer organizations. The lab uses a number of partnering mechanisms, including Cooperative Research and Development Agreements (CRADAs), Strategic Partnership Projects (SPP), Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) projects. The lab also accommodates proprietary research.

For more information about Jefferson Lab's Tech Transfer activities, contact our Chief Technology Officer Drew Weisenberger at drew@jlab.org

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