FEDERAL RESEARCH FUNDING DRIVES MATERIALS SUCCESS

Artificial Intelligence and Machine Learning

GE Research uses Artificial Intelligence and Machine Learning for inspection applications. Human inspection of the various components of aircraft engines are subjective, based on the expertise of the individual inspector. GE Research implements AI/ML to ensure that newly made engine parts conform with design specifications, to assess wear and tear, and for life prediction of the materials.

▶ **General Electric Aviation Turbine**

GE Aviation created a deep neural network to assist with manufacturing its aircraft engine turbine blades. Shown as a high-pressure turbine Ni-based superalloy blade with a thermal barrier coating and cooling holes less than 1 mm in diameter. Courtesy of GE Aviation.

MRS Bulletin **44**, 545–558 (2019).

Federal Funding

In FY2021, $5 billion was allocated to the Department of Defense for AI; $1.5 billion was allocated to federal nondefense AI funding, which is nearly a $1 billion increase over FY2018.

Source: 2021 Congressional Research Service

The Materials Research Society expertise is at your service

Materials Research Society expertise spans materials in the areas of semiconductors, batteries, and artificial intelligence and machine learning and understands the role of science in helping inform policy. To communicate with an expert, contact MRS at **Advocacy@mrs.org.**

Scan the QR Code to learn more or visit mrs.org/advocacy

THANK YOU
Federal Research Funding allows for these advances to continue impacting the world and improving the quality of life.

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Basic Research ➡ Commercial

*From research to commercialization, **AI** is revolutionizing the way we do science.*

Basic Research

Berkeley Lab researcher Yan Zeng looks over the starting point at **A-Lab.** The new laboratory combines automation and artificial intelligence to speed up materials science discovery. Marilyn Sargent/Berkeley Lab

AI-driven Labs

In 2023, Lawrence Berkeley National Laboratory introduced a robot named **A-Lab.** A-Lab uses machine learning and active learning to plan experiments, and eventually produced 41 novel compounds over the course of 17 days, a feat that would have taken numerous researchers untold numbers of hours. The creation of A-Lab was primarily funded by the **US Department of Energy,** with some support from the **National Science Foundation.**

Source: Nature 624, 86–91 (2023)

Industry

AI-platform

Citrine Informatics uses AI to help companies develop new materials and reduce R&D costs for their products, including the development of batteries and catalysts, advanced metals and alloys for aircraft, and novel polymers and plastics. Citrine Informatics has partnered with Boeing, BASF, Dow, Honda, and many others.

Source: Citrine Informatics

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