To direct the Department of Energy and the National Oceanic and Atmospheric Administration to conduct collaborative research in order to advance numerical weather and climate prediction in the United States, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

M. introduced the following bill; which was referred to the Committee on ____________________

A BILL

To direct the Department of Energy and the National Oceanic and Atmospheric Administration to conduct collaborative research in order to advance numerical weather and climate prediction in the United States, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the “Advanced Weather Model Computing Development Act”.
SEC. 2. DEFINITIONS.

In this Act:

(1) DEPARTMENT.—The term “Department” means the Department of Energy.

(2) National Laboratory.—The term “National Laboratory” has the meaning given such term in section 2 of the Energy Policy Act of 2005 (42 U.S.C. 15801).

(3) Secretary.—The term “Secretary” means the Secretary of Energy.

(4) Administrator.—The term “Administrator” means the Administrator of the National Oceanic and Atmospheric Administration.

SEC. 3. DEPARTMENT OF ENERGY AND NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION RESEARCH AND DEVELOPMENT COORDINATION.

(a) In General.—The Secretary and Administrator shall carry out collaborative research and development activities in artificial intelligence and high performance computing, focused on the advancement of climate models and operational numerical weather prediction skill to support National Oceanic and Atmospheric Administration mission requirements and the advancement of Department computational and networking capabilities to analyze, model, simulate, and predict complex phenomena.
(b) MEMORANDUM OF UNDERSTANDING.—The Secretary and Administrator shall carry out the activities under subsection (a) through the establishment of a memorandum of understanding, or other appropriate interagency agreement. Such memorandum or agreement, as the case may be, shall require the use of a competitive, merit-reviewed process, which considers applications from Federal agencies, National Laboratories, institutions of higher education, nonprofit institutions, and other appropriate entities.

(c) ACTIVITIES.—In carrying out the activities under subsection (a), the Secretary and Administrator may—

(1) conduct collaborative research in modeling and simulation, machine learning, data assimilation, large scale data analytics, and predictive analysis in order to optimize algorithms for climate modeling and numerical weather prediction;

(2) explore options for performance portability of the optimized weather model codes between the operational computing systems of the National Oceanic and Atmospheric Administration and the Department’s high performance computers;

(3) develop methods to accommodate large data sets on weather and climate information with variable quality and scale;
(4) collaborate on new approaches and maximize the use of algorithms developed through artificial intelligence, machine learning, data analytics, natural language processing, modeling and simulation, with a focus on new algorithms suitable for high performance computing systems and numerical weather prediction or climate models;

(5) to the maximum extent practicable, and in compliance with national security policies, promote collaboration, open community-based development, and data sharing between Federal agencies, National Laboratories, institutions of higher education, non-profit institutions, and other appropriate entities by providing the necessary access and secure data transfer capabilities; and

(6) support scientific computing infrastructure as the Secretary and Administrator determine appropriate.

(d) COORDINATION.—In carrying out the activities under subsection (a), the Secretary and Administrator are authorized to—

(1) carry out reimbursable agreements between the Department, the National Oceanic and Atmospheric Administration, and other entities in order to
maximize the effectiveness of research and development to improve numerical weather prediction; and

(2) collaborate with other Federal agencies as appropriate.

(e) REPORT.—Not later than two years after the date of the enactment of this Act, the Secretary and Administrator shall submit to the Committee on Science, Space, and Technology of the House of Representatives, and the Committee on Commerce, Science, and Transportation and the Committee on Energy and Natural Resources of the Senate, a report detailing the following:

(1) Interagency coordination between each Federal agency involved in the research and development activities carried out under this section.

(2) Potential opportunities to expand the technical capabilities of the Department and the National Oceanic and Atmospheric Administration.

(3) Collaborative research achievements.

(4) Areas of future mutually beneficial gains by such activities.

(5) Continuation of coordination between the Department and the National Oceanic and Atmospheric Administration.
SEC. 4. CLIMATE AND WEATHER PREDICTION ON HIGH PERFORMANCE COMPUTERS INITIATIVE.

(a) In General.—The Secretary and Administrator shall carry out an initiative to run advanced model code, including climate and operational weather models, on the Department high performance computers in order to conduct proof of concept scenarios and comparison to current issued forecasts and models. The Secretary and Administrator shall carry out such initiative through a competitive, merit-reviewed process, and consider applications from Federal agencies, National Laboratories, institutions of higher education, nonprofit institutions, and other appropriate entities.

(b) Components.—In carrying out the initiative under subsection (a), the Secretary and Administrator shall prevent duplication and coordinate research efforts in artificial intelligence, high performance computing, modeling and simulation, machine learning, and data assimilation across the Department, and may—

(1) run real-time weather forecast scenarios to conduct comparative research on National Weather Service issued forecasts to forecasts issued through the use of operational models run on high performance computers;

(2) share relevant modeling system and applications innovations developed through such initiative,
including Unified Forecast System-based applications, through community-based activities; and

(3) leverage related weather and climate efforts and data from the National Science and Technology Council and the Interagency Council for Advancing Meteorological Services.

(c) REPORT.—Not later than two years after the date of the enactment of this Act, the Secretary and Administrator shall submit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation and the Committee on Energy and Natural Resources of the Senate a report evaluating the following:

(1) The effectiveness of the initiative under subsection (a), including applied research discoveries and operational weather prediction improvements achieved.

(2) Potential opportunities to expand the technical capabilities of the Department and the National Oceanic and Atmospheric Administration through the development of artificial intelligence and data analytics technologies.

(d) SUNSET.—The authority under this section shall terminate five years after the date of the enactment of this section.
SEC. 5. RESEARCH SECURITY.

The activities authorized under this Act shall be applied in a manner consistent with subtitle D of title VI of the Research and Development, Competition, and Innovation Act (enacted as division B of the CHIPS Act of 2022 (Public Law 117–167; 42 U.S.C. 19231 et seq.)).