



Republic of the Philippines  
**House of Representatives**  
Quezon City

**TWENTIETH CONGRESS**

*First Regular Session*

House Bill No. **1079**



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**Introduced by Representative Albert S. Garcia**

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#### **EXPLANATORY NOTE**

This measure seeks to strengthen the advanced manufacturing industry by upgrading and designating the Design, Research and Extension in Additive Manufacturing (DR3AM) Center at the Bataan Peninsula State University (BPSU) as the center for three-dimensional (3D) printing and advanced manufacturing in the country.

Additive manufacturing, also known as 3D printing, a method of creating a three-dimensional object layer-by-layer through a computer-aided design (CAD) model, continuously gains considerable attention in the academic and research communities as well as in several industries around the world. Its innovative capacity to design, produce and simplify prototypes, and manufacture high quality 3D prints cost cheaper at a shorter period of time. These advancements in 3D printing constantly change how products are designed, manufactured, and used by consumers worldwide.

In 2018, the Department of Science and Technology (DOST) launched two new 3D printing research laboratories: the Additive Manufacturing Research Laboratory (AMREL) and the Additive Manufacturing Center (AMCen). The DOST established these facilities to aid the Philippines in developing its advanced manufacturing industry and be abreast with the continuous world's technological innovation.

AMREL, presently referred to as the DR3AM Center, is the first 3D printing research facility in the Philippines equipped with the latest advanced manufacturing machines. It was inaugurated in 2019 at the Bataan Peninsula State University (BPSU) and has, since then, been used by BPSU faculty and students in conducting research for their theses on the applications of 3D printing; development, testing and characterization of new 3D printing materials; sharing of ideas between faculty and students; and rapid prototyping, tooling and manufacturing in the 3D printing industry.

Starting as a research laboratory in 2019, BPSU's DR3AM Center began its operation in 2020. To date, the BPSU has already published over 50 scientific articles related to 3D printing and several utility models and industrial designs have been submitted to the Intellectual Property Office. The DR3AM Center also caters to some spare parts requirements of local businesses and industries in the region. Since 2019, several high school and college student groups have already utilized the existing facilities of the DR3AM Center for their research

projects. The DR3AM Center has also trained several faculty members of the BPSU and partner government institutions and private entities on advanced manufacturing.

During the height of the COVID-19 pandemic, the DR3AM Center produced over 3,000 personal protective equipment (PPEs) to help protect our healthcare workers and other frontliners. Through the various projects of DR3AM Center, the BPSU started the incorporation of the additive manufacturing subject in the curriculum of the Bachelor of Science degree in Industrial Engineering, a first in the country. In 2021, the DR3AM Center also hosted the International Forum on Additive Manufacturing and Advanced Materials as well as the National Symposium on Makerspaces and 3D Printing Facilities.

As an important component of higher education, research centers play an indispensable role in facilitating the advancement of technology, promotion of interdisciplinary collaboration, and the development of transdisciplinary research programs. The operation of BPSU's DR3AM Center as the center for additive manufacturing or 3D printing, advanced materials and advanced manufacturing will spur interest in the advanced manufacturing research and development towards the fulfillment of BPSU's mission of expanding the advanced manufacturing industry for the benefit of the country.

Thus, to catalyze and achieve the full potential of the DR3AM Center as the center for additive manufacturing or 3D printing, advanced materials, and advanced manufacturing, it is crucial that the center be strengthened with the most important elements: structure, facilities, human resources, skills development programs, and financial support.

In view of the foregoing, approval of this bill is earnestly sought.

  
REP. ALBERT S. GARCIA  
Second District, Bataan



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**AN ACT**

**STRENGTHENING THE ADVANCED MANUFACTURING INDUSTRY BY UPGRADING AND DESIGNATING THE DR3AM CENTER OF THE BATAAN PENINSULA STATE UNIVERSITY AS THE CENTER FOR RESEARCH AND DEVELOPMENT ON ADVANCED MANUFACTURING AND APPROPRIATING FUNDS THEREFOR**

*Be it enacted by the Senate and House of Representatives of the Philippines in Congress assembled:*

**SECTION 1. *Short Title.*** – This Act shall be known as the “*DR3AM Center Act.*”

**SEC. 2. *Declaration of Policy.*** – Section 10, Article XIV of the Constitution provides that “*Science and technology are essential for national development and progress. The State shall give priority to research and development, invention, innovation, and their utilization; and to science and technology education, training, and services. It shall support indigenous, appropriate, and self-reliant scientific and technological capabilities, and their application to the country’s productive systems and national life.*”

Towards this end, the State shall promote and strengthen the development and growth of local innovative ventures, upscale research and development facilities of higher educational institutions, enhance literacy and skills of the academe’s scientific workforce, faculty and students, build up its collaboration with the business sector, and spearhead the development and growth of the advanced manufacturing industry.

**SEC. 3. *Definition of Terms.*** – As used in this Act:

(a) *Additive manufacturing* refers to the industrial production name for 3D printing,

1 which is the process of transmitting to a three-dimensional printer the digital design that guides  
2 the fabrication of a three-dimensional solid product, by depositing materials layer by layer rather  
3 than cutting away from a large block of existing material as in most traditional manufacturing,  
4 thereby enabling the cost-effective production of complex structures;

5 (b) *Advanced manufacturing* refers to the use of innovative technologies and  
6 processes in manufacturing existing products and the production of new products enabled by  
7 advanced technologies which includes automation, additive manufacturing, and robotics, to  
8 improve the efficiency and productivity of manufacturing advanced materials; and

9 (c) *Advanced materials* refer to a range of advanced polymers, nanoparticles,  
10 ceramics, and graphene composites used in 3D printing which enable traditional and advanced  
11 electronic applications while taking advantage of the design and fabrication flexibility of additive  
12 manufacturing systems.

13 SEC. 4. **3D Printing Center.** – The Design, Research and Extension in Additive  
14 Manufacturing (DR3AM) Center of the Bataan Peninsula State University (BPSU), hereinafter  
15 referred to as the Center, is upgraded and designated as the center for research and  
16 development on additive manufacturing, advanced materials, and advanced manufacturing.  
17 The Center shall be an independent agency attached to the Department of Science &  
18 Technology (DOST). The Center shall have its own budget separate from the DOST.

19 SEC. 5. **Powers and Functions.** – The Center shall have the following powers and  
20 functions:

21 (a) Identify and prioritize research and development projects that maximize and  
22 develop the competency in 3D printing and advanced manufacturing of the country;

23 (b) Solve societal problems and develop technologies using 3D Printing  
24 Technologies;

25 (c) Secure the latest and state-of-the-art facilities for the development, design,  
26 analysis, and production of new and innovative advanced materials and technologies for rapid  
27 prototyping, and industrial and commercial applications;

28 (d) Conduct appropriate training courses on 3D printing and advanced manufacturing

1 for the faculty, students, and scientific workforce of BPSU and other educational institutions;

2 (e) Spearhead 3D-themed activities, competitions, events, and conventions where  
3 international experts are invited to bring in new 3D printing ideas and technologies, broaden the  
4 knowledge of the faculty and students of educational institutions and further develop their ideas  
5 on advanced manufacturing;

6 (f) Strengthen the academe-industry partnerships in advanced manufacturing  
7 research and development by encouraging local and foreign investors to support or jointly  
8 venture in potentially viable 3D printing enterprises, start-ups or business ideas;

9 (g) Produce advanced materials products for commercialization using 3D printing and  
10 advanced manufacturing technologies towards providing income-generating services to private  
11 enterprises;

12 (h) Establish local and foreign linkages in 3D printing research and policy  
13 development;

14 (i) Establish *DR3AM Laboratories* in various parts of the country;

15 (j) Serve as the repository of all 3D printing-related researches, studies, and data  
16 generated by the Center and other academic, public, and private groups, organizations, and  
17 institutions;

18 (k) Propose and allocate its annual budgetary resources while optimizing resource  
19 generation and utilization; and

20 (l) Receive and manage grants, aid, donations, contributions, or any kind of  
21 assistance for achieving its objectives, in accordance with the rules and regulations of the  
22 DOST. The amounts received and the sources of grants, aid, donations, contribution, or any  
23 kind of assistance received shall be published on its website for purposes of transparency.

24 SEC. 6. **Board of Directors.** – The Center shall be administered by the Board of  
25 Directors which is composed of a Chairperson, a Vice-Chairperson and nine (9) members. The  
26 Secretary of Science and Technology and the President of the Bataan Peninsula State  
27 University shall be the *ex officio* Chairperson and Vice-Chairperson of the Board, respectively.

1           The Secretary of the Department of Trade and Industry, Director General of the  
2           Technical Education and Skills Development Authority, Chairperson of the Commission on  
3           Higher Education, two (2) representatives from the BPSU faculty, researchers and staff relevant  
4           to the advanced manufacturing industry to be selected by the Chairperson from among the list  
5           of nominees submitted by BPSU shall be *ex officio* members. In addition, two (2)  
6           representatives from the faculties of private higher educational institutions relevant to the  
7           advanced manufacturing industry, to be appointed by the President of the Philippines and two  
8           (2) representatives from non-governmental or advocacy organizations on advanced  
9           manufacturing to be selected by the Chairperson from among the list of nominees submitted by  
10          the non-governmental or advocacy organizations on advanced manufacturing, likewise to be  
11          appointed by the President of the Philippines for a term of four (4) years, as members.

12          The Board shall promulgate its rules relative to meetings, quorum requirements and  
13          compensation or allowances of the members of the Board.

14          **SEC. 7. *Functions.*** – The Board shall perform the following functions:

15          (a) Provide the general direction and priorities of the Center in accordance with this  
16          Act;

17          (b) Formulate policies, programs and projects for the development of the advanced  
18          manufacturing industry;

19          (c) Evaluate the implementation, efficiency and effectiveness of the programs and  
20          projects of the Center;

21          (d) Approve the annual budget of the Center and laboratories;

22          (e) Establish DR3AM Laboratories in other parts of the country;

23          (f) Approve the organizational structure of the Center and laboratories including  
24          position classification and compensation of employees in coordination with the Department of  
25          Budget and Management;

26          (g) Approve the appointment of consultants, officers, and employees of the Center  
27          and laboratories;

28          (h) Monitor and review the programs and projects undertaken by the executive

1 director to implement and enforce research and policy direction and priorities;

2 (i) Assist the Executive Director in generating resources and obtaining logistical and  
3 financial support for the programs and projects of the Center and laboratories; and

4 (j) Assign additional powers, functions, and duties of the Executive Director in  
5 accordance with the objectives of this Act.

6 **SEC. 8. *Organizational Structure.*** – The Center's research and policy direction and  
7 priorities shall be determined by the Board and implemented by an Executive Director appointed  
8 in accordance with Section 9 of this Act. Within thirty (30) days after the effectivity of this Act,  
9 the Executive Director shall draw the organizational structure and staffing pattern of the Center  
10 to be approved by the Board. In carrying out its functions, the Center shall be supported by a  
11 pool of experts and researchers on advanced manufacturing and related sectors from various  
12 public and private universities across the country, and other technical staff.

13 **SEC. 9. *Executive Director.*** – The Center is headed by an Executive Director who  
14 shall be appointed by the President of the Philippines for a term of four (4) years subject to  
15 reappointment, a Filipino citizen, at least thirty-five (35) years of age, a degree holder in  
16 computer engineering, mechanical engineering, applied mathematics, computer science or  
17 related field of studies, possess executive and management experience of at least ten (10)  
18 years, and considerable knowledge on the advanced manufacturing industry.

19 **SEC. 10. *Functions of the Executive Director.*** – The Executive Director shall:

20 (a) Implement and enforce research and policy direction and priorities, policies,  
21 decisions, orders, rules, and regulations determined by the Board;

22 (b) Oversee the day-to-day operations of the Center, provide technical and  
23 administrative support to the Board, and assist the Board in the performance of its tasks;

24 (c) Exercise administrative and supervisory functions over the planning,  
25 implementation, and evaluation of the policies, programs, and projects of the Center including  
26 laboratories as may be established pursuant to this Act;

27 (d) Recommend to the Board the organizational structure of the Center including the  
28 position classification and compensation of employees; qualification and appointment of

1 consultants, officers, and employees of the Center and laboratories; and overall budget of the  
2 Center;

3 (e) Submit to the Board regular reports on the Center, to include annual reports on  
4 operations, status of programs and projects, and the financial condition of the Center;

5 (f) Apprise regularly the Board on the programs and projects of the Center;

6 (g) Execute contracts, incur obligations, acquire and dispose of assets, and deliver  
7 documents on behalf of the Center, including negotiated or consultancy contracts for personnel  
8 and for the Center's pool of researchers within the limits of the authority determined by the  
9 Board;

10 (h) Generate and obtain logistical and financial support for the programs and projects  
11 of laboratories with the assistance of the Board; and

12 (i) Exercise and perform such other powers, functions, and duties as may be  
13 authorized or assigned by the Board in accordance with this Act.

14 SEC. 11. **Satellite 3D Printing Laboratories.** –DR3AM Laboratories may be  
15 established by the Board. The DR3AM Laboratory shall be headed by a Manager to be  
16 appointed by the Board from a list of pre-screened and qualified applicants submitted by the  
17 Executive Director based on criteria approved by the Board.

18 SEC. 12. **Functions of the Directors of DR3AM Laboratories.** – Subject to the  
19 policies of the DR3AM Center, the Managers of subsequent DR3AM Laboratories shall perform  
20 the following functions:

21 (a) Administer the policies, programs and projects of the DR3AM Center in the  
22 DR3AM Laboratory;

23 (b) Recommend the creation of divisions and sections including the staffing pattern in  
24 the DR3AM Laboratory;

25 (c) Prepare the budget of the DR3AM Laboratory;

26 (d) Approve the expenditures of the DR3AM Laboratory;

27 (e) Recommend to the Executive Director the appointment of personnel or  
28 consultants;

1 (f) Recommend policies, programs and projects to the Executive Director of the  
2 DR3AM Center; and

3 (g) Perform such other functions as may be assigned by the Executive Director of the  
4 DR3AM Center.

5 SEC. 13. **Coordination of the DR3AM Center with DR3AM Laboratories** – The Board  
6 shall, through the Executive Director, coordinate, monitor and evaluate the implementation of  
7 the programs in the DR3AM Laboratories.

8 SEC. 14. **Donations and Grants.** – All donations, contributions, grants, bequests, or  
9 gifts, in cash or in kind, shall be received and used directly and exclusively for the benefit of the  
10 advanced manufacturing industry.

11 SEC. 15. **Appropriations.** – The amount necessary for the initial implementation of this  
12 Act shall be charged against the current budget of the Department of Science and Technology.  
13 Thereafter, the funds necessary for the continuous implementation of this Act shall be included  
14 in the annual General Appropriations Act.

15 SEC. 16. **Implementing Rules and Regulations.** – Within sixty (60) days from the  
16 effectivity of this Act, the Secretary of Science and Technology shall, in coordination with the  
17 designated members of the Board, promulgate the necessary rules and regulations for the  
18 effective implementation of this Act.

19 SEC. 17. **Separability Clause.** – If any section or provision of this Act is declared  
20 unconstitutional or invalid, the other sections or provisions which are not affected shall remain  
21 in full force and effect.

22 SEC. 18. **Repealing Clause.** – All laws, presidential decrees, executive orders, rules,  
23 and regulations or parts thereof inconsistent with or contrary to the provisions of this Act are  
24 hereby repealed, amended, or modified accordingly.

25 SEC. 19. **Effectivity.** – This Act shall take effect fifteen (15) days after its publication in  
26 the *Official Gazette* or in a newspaper of general circulation.

27 Approved,  
28