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EDITORIAL MATERIAL

A brief overview of the School of Aerospace Engineering of Tsinghua University



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Abstract This article provides a brief overview of the teaching and research at the School of Aerospace Engineering (SAE) to celebrate the 80th anniversary of the establishment of aeronautics as a discipline at Tsinghua University. The evolution of the school, undergraduate/graduate students and faculty members, and research activities and achievements have been described. The research input including research funding and research projects are summarized, showing a diversity of funding sources and a significant growth in either sum total or spending per researcher. The achievements including publications and inter/national academic awards are also introduced. It can be seen that the level of academic publications has been growing over the past decades. In addition, four representative research achievements have been briefly described to show the scientific contributions of the school.

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1. Introduction

The discipline of aviation and mechanics at Tsinghua University originated in the 1930s, with the aeronautical engineering research division being founded in 1934. This was the earliest one of its kind in China, and was later evolved into an institute in 1936. The Department of Aeronautical Engineering was established in 1938, and was reorganized as the School of Aeronautical Engineering in 1951. However, this school was separated from Tsinghua University due to adjustment of

disciplines and departments of higher education all around China in 1952.¹

To cultivate talents for space engineering, the Department of Engineering Mechanics (DEM) was set up in 1958. Forty years later in 1998, the Space Center was established. Two significant milestones of the Space Center are two launches of university satellites in 2000 and 2004. On May 18, 2004, the School of Aerospace Engineering (SAE) was re-established, appointing Prof. Yongzhi Wang as the Dean, who was a member of the Chinese Academy of Engineering and the first chief designer of the Chinese manned space engineering program.

At present, the SAE has two departments, the DEM and the Department of Aeronautical and Astronautical Engineering (DAAE), as shown in Fig. 1. The Space Center is also managed by the SAE. The DEM has four institutes: Institute of Solid Mechanics, Institute of Fluid Mechanics, Institute of Biomechanics and Medical Engineering, and Institute of Engineering Thermophysics. The DAAE has six institutes:

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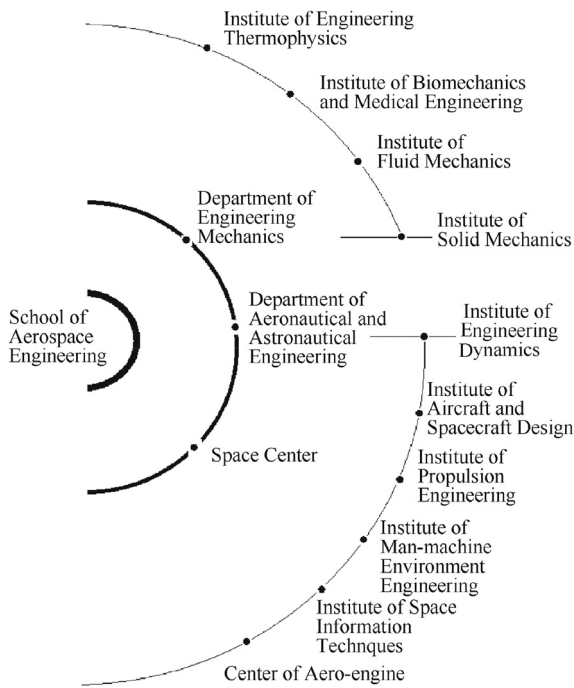


Fig. 1 Hierarchical structure of the SAE.

Institute of Engineering Dynamics, Institute of Aircraft and Spacecraft Design, Institute of Propulsion Engineering, Institute of Man-machine Environment Engineering, Institute of Space Information Techniques, and Center of Aero-engine.² To promote the development of cross-disciplinary research on aeronautical and astronautical science and technologies, the school has organized several joint-research centers across the departments of Tsinghua University and between the institutes in related fields.

Based on the advantages of research on mechanics and thermophysics, the school has gradually established a system of disciplines related to aerospace.

This article summarizes the current status of the SAE, introduces the undergraduate and graduate programs offered by the school, as well as research activities including funding and projects, publications and typical research achievements.

2. Students and faculty members

2.1. Undergraduate programs

The undergraduate programs offered by the SAE lasts four years, with each year having three semesters. Each year, the school enrolls approximately 130 students in the undergraduate programs including Mechanical Engineering, Power & Thermal Physics, and Aeronautics & Astronautics. The school currently has 516 undergraduate students, with the student-teacher ratio being around 5:1.

The SAE now offers more than 80 undergraduate courses, with four courses being taught in English, and the school will continue to develop English or bilingual courses in the next ten years. To obtain the Bachelor's degree, students are required to earn 171 credits, with 117 credits for specialty courses (86

credits for spring/autumn semester courses; 15 credits for thesis completion; the others for practical training in summer semesters), 44 credits for general courses, and 10 credits for non-specialty courses.

Further information on the undergraduate programs offered by the SAE can be found in Ref.³.

2.2. Graduate programs

The SAE currently has 664 graduate students, 70% of whom are doctoral students. The school now has had 13 international students, including 7 doctoral students and 6 graduate students, since it began to enroll international students three years ago.

The core courses offered for the doctoral students consist of three major modules: philosophy, mathematics, and specialty courses. The core courses offered for the master students consist mainly of three modules: philosophy, foreign languages, and specialty courses, and it generally takes one year to complete the master's degree courses.

Further information on SAE graduate programs can be found in Ref.³.

2.3. Faculty members

The SAE currently has 120 faculty members, including 105 teachers, of which 52 are professors, 46 are associate professors, and 7 are assistant professors.⁴ The age distribution of the faculty members is shown in Fig. 2(a). The final education background of the faculty members is shown in Fig. 2(b), with graduates from Tsinghua University, other universities, and overseas universities accounting for 60%, 20%, and 20%, respectively.

2.4. Employment of students

The employment rates of our students at the year of graduation are shown in Fig. 3.

In 2017, the SAE had 117 graduates (113 obtained the bachelor's degree, and 4 obtained the certificate of completion), and the graduation rate is 96.6%. According to the statistics by the Ministry of Education, the employment rate of the undergraduates enrolled in 2013 is 97.62% (further study was also counted as employment). There were 19 students who went abroad for further study, accounting for 22.6%, of whom 13 went to American universities such as the Massachusetts Institute of Technology and the University of Pennsylvania; 3 went to the University of Cambridge; 2 went to the University of Tokyo. A total of 45 students were selected to further their study at domestic universities, accounting for 53.6%, of whom 44 chose to continue their study at Tsinghua University.

The employment rate of the SAE master students remains very high. For example, the employment rate of the graduate students in the 2017 was 94.62%, a slight decrease from the previous year. There are 35 master's degree graduates in 2017, of whom 29 are contract employees; 5 choose to continue their study. There are 58 doctoral degree graduates in 2017, of whom 33 are contract employees; 19 choose to continue their study.

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