

第十九届“高教杯”全国大学生先进成图技术与产品信息建模创新大赛国际赛道——“高精度 3D 视觉数字化测量与建模”赛道竞赛大纲

19th "Higher Education Cup" National College Student Innovation Competition for Advanced Graphics Technology and Product Information Modeling – International

Track——

“High-Precision 3D Vision Digital Measurement and Modeling” Track

Competition Syllabus

一、竞赛目的 Competition Objectives

在全球工业 4.0 与智能制造快速发展的背景下，高精度 3D 视觉技术显著提升了产品设计的效率与精度，缩短了产品研发周期，并推动复杂结构设计的创新突破，为制造业转型升级提供了关键支持。

本赛道旨在推动三维扫描及数字化检测技术在大学生中的普及与应用，培养学生掌握从高精度三维数据采集、逆向建模到产品智能检测的全闭环工作流程。重点考察学生在精密测量、数据处理与分析、质量评估方面的综合能力，衔接现代制造业对质量控制和数字化检测人才的迫切需求。

Against the backdrop of rapid advancement in Industry 4.0 and intelligent manufacturing worldwide, high-precision 3D vision technologies have significantly improved the efficiency and accuracy of product design, shortened R&D cycles, and driven innovative breakthroughs in complex structural design, providing critical support for the transformation and upgrading of the manufacturing industry.

This track aims to promote the popularization and application of 3D scanning and digital inspection technologies among university students, and to cultivate students'

ability to master the full closed-loop workflow from high-precision 3D data acquisition and reverse modeling to intelligent product inspection. It focuses on evaluating students' comprehensive capabilities in precision measurement, data processing and analysis, and quality evaluation, so as to meet the urgent demand for talents in quality control and digital inspection in modern manufacturing.

二、竞赛方式 Competition Format

本赛道为封闭式比赛，以团队（1组2人）为单元协作完成赛题要求。

This track adopts a closed competition format. Participants shall form teams of 2 members per group to collaboratively complete the required tasks.

报名时间：2026年4月1日09:00-6月10日24:00；

Registration Period: 09:00, April 1, 2026 – 24:00, June 10, 2026

竞赛日程：Competition Schedule

(1) 省级预选赛：由各赛区组委会自行决定是否举办。

(2) 全国总决赛：2026年7月3日至7月5日（7月3日报到，7月4日竞赛，7月5日闭幕）

(1) Provincial Qualifiers: The decision on whether to hold the qualifiers shall be made independently by the organizing committee of each regional contest division.

(2) National Finals: July 3 – July 5, 2026 (Check-in: July 3; Competition: July 4; Closing Ceremony: July 5)

三、竞赛内容

根据赛题要求，选手需要完成以下内容：

任务一：零件三维数据采集(分数占比30%)

根据现场提供的实物零件，使用扫描仪获取完整的零件点云数据，扫描结果需输出为 STL 格式文件。合理规划扫描路径、扫描步骤。推荐使用先临三维的扫描仪及配套软件。

任务二：零件逆向建模(分数占比 30%)

根据提供的扫描数据和实物零件，使用逆向设计软件完成零件的逆向建模工作。此任务不得使用游标卡尺、深度尺等量具，需提交一份 qsf 格式工程文件、STP 格式文件和尺寸表。推荐使用先临三维逆向设计软件。

任务三：零件尺寸检测(分数占比 40%)

根据提供的扫描数据和数模，按照测量要求，使用三维检测软件完成两个零件的尺寸检测工作，最终输出检测报告。每个零件分别提交一份 SNIProj 格式工程文件和 PDF 检测报告。推荐使用先临三维的三维检测软件。

Participants are required to complete the following tasks in accordance with the competition requirements:

Task 1: 3D Data Acquisition of Parts (30%)

Based on the physical parts provided on-site, participants shall use a scanner to obtain complete point cloud data, and the scanned result shall be exported as an STL file. The scanning path and procedure shall be properly planned. The use of Shining 3D scanners and corresponding software is recommended.

Task 2: Reverse Modeling of Parts (30%)

Based on the provided scan data and physical parts, participants shall complete reverse modeling using reverse engineering software. Measuring tools such as vernier calipers and depth gauges are not allowed in this task. Submissions include: one QSF

engineering file, one STP file, and a dimension table. The use of Shining 3D reverse engineering software is recommended.

Task 3: Dimensional Inspection of Parts (40%)

Based on the provided scan data and CAD model, participants shall perform dimensional inspection for two parts using 3D inspection software in accordance with measurement requirements, and generate a final inspection report. For each part, submit one SNIProj engineering file and one PDF inspection report. The use of SHINING 3D 3D inspection software is recommended.

四、竞赛平台使用要求 Requirements for Competition Platform

在赛事现场，先临三维提供设备与软件的统一技术支持。

At the competition venue, SHINING 3D will provide unified technical support for equipment and software.

五、技术支持 Technical Support

先临三维科技股份有限公司：SHINING 3D Technology Co., Ltd.

赛道咨询：张老师 18067984462

Q&A: Miss Zhang

Tel: 18067984462

全国大学生先进成图技术与产品信息建模创新大赛组委会

National College Student Innovation Competition for Advanced Graphics Technology and

Product Information Modeling Organizing Committee

2026 年 4 月

April 2026