ASC26 Student Supercomputer Challenge

Final Competition Announcement

Dear ASC26 finalists:

The ASC26 Committee is pleased to congratulate all teams qualified for the finals of the ASC26 Student Supercomputer Challenge, to be held on-site at Wuxi University.

Each team is required to consist of one adviser and five undergraduate students, maintaining the same lineup as originally registered for the Preliminary Round. If any changes are required, teams must submit a formal request, together with a clear justification, by email to info@asc-events.org. We sincerely commend your achievement and look forward to welcoming you to the ASC26 finals.

- During the finals, each team is required to design and set up its platform on-site in compliance with a total **power consumption limit of 5 kW,** while executing the approved application tasks outlined in this announcement. The cluster must comprise **at least three compute nodes**, with each node subject to a **maximum power limit of 2 kW.**
- Each team is required to complete the **Hardware Platform Equipment Form** for the Final Stage (Appendix I) and submit it by email to TechSupport@asc-events.org by April 5, 2026. The ASC26 Committee will make the necessary resource arrangements to ensure that the required equipment is available for the finals.
- The on-site finals will begin each day at 8:00 AM (UTC+8).
- The Final Competition will include **the Group Competition as part of the overall scoring** framework. It is intended to encourage direct collaboration and knowledge sharing among teams, particularly in areas such as equipment support and application optimization.
- Additionally, in contrast to previous editions, **this year's Team Presentation will adopt a significantly revised format**. This new format is intended to promote stronger interaction and communication between participating teams and the judges, while also encouraging exchange among the teams themselves and with the on-site audience.
- For the detailed rules and regulations of the finals, please refer to Appendix II.

Schedule of the Finals

Date	Time	Content	
May 15	Check-in		
May 16	08:00-08:30	The opening ceremony of the ASC26 finals	There is no limit on the runtime power consumption of the entire cluster during these periods.
	08:30-20:30	Announcement of contest rules, cluster building and testing	
May 17	08:00-20:00	Cluster building and testing	
May 18	08:00-18:00	Performance testing of HPL, HPCG,	The runtime power

		Group Competition, and Embodied World Model Optimization	consumption of the entire cluster should
May 19	08:00-18:00	AMSS-NCKU, QiboTN, and Mystery application	be **less than 5 kW, with each node having a power limit of 2 kW.** The system platform cannot be rebooted or changed during May 18-19.
May 20	08:00-12:10	Team Presentation	
	15:00-18:30	The Awards Ceremony	
May 21	Check-out		

Note: Check-in must not be earlier than May 14, 2026, and check-out must not be later than May 22, 2026. Should an extended stay be required due to long-distance travel or other circumstances, please submit a request by email to info@asc-events.org

Appendix I

ASC26 Student Supercomputer Challenge

Hardware Platform and Equipment for the Final Stage

Power Consumption Restrictions and Hardware Platform Description.

a) The primary objective is to design and optimize computing systems to achieve the highest possible performance while executing the approved applications within the 5 kW power consumption limit. Any failure to comply with this power constraint will result in the invalidation of the corresponding team's task.

b) Each team is required to design its cluster based on the servers and components listed below. The ASC26 Committee will provide all necessary hardware, excluding GPUs. Teams may opt to use additional components at their own expense; however, the servers must be those supplied by the ASC26 Committee. During the final stage (May 18–19, 2026), the system platform must remain unchanged, and no reboots or modifications are allowed. **Teams must complete the Hardware Platform Equipment Form for the Final Stage (see table below) and submit it via email to techsupport@asc-events.org by April 5, 2026. The ASC Committee will provide machines according to the quantities specified in the form. Teams should carefully assess their hardware requirements, as the requested machines cannot be returned on-site and must be fully operational throughout the event.** Additionally, hardware configurations may be subject to minor adjustments due to unforeseen circumstances.

c) The competition equipment must remain continuously powered on. Reboots are permitted only in cases of hardware failure and must be preceded by notification to the ASC26 staff. Hibernation and suspension modes are strictly prohibited, as standby states

are inconsistent with operational requirements.

d) The sponsors of the ASC26 Finals will provide AMD W7900D GPUs for all participating teams. Each team may determine at its own discretion whether to utilize these GPUs.

Item	Name	Configuration	Note
Server	Dual Processor Server	CPU: AMD EPYC 9755 (2.7 GHz, 128 cores, 512MB cache) * 2 Memory: 32GB DDR5 6400 MT/s * 24 SSD: 960GB SSD SATA * 1	These items will be provided by the ASC26 Committee.
RDMA NIC	NDR400	NVIDIA MCX75310AAS-NEAT	
Switch	Ethernet switch	10/100/1000 MB/s, 24-port Ethernet switch	
	NDR-IB switch	NVIDIA Quantum™-2 NDR InfiniBand Switch, 64-ports NDR, 32 OSFP ports, unmanaged, P2C airflow (forward)	
Cable	Gigabit CAT6 cables	CAT6 copper cable, blue, 3 m	
	InfiniBand cable	InfiniBand NDR 200 copper cable, OSFP port, compatible with the InfiniBand switch in use	
GPU	ASC26 Committee will provide the servers, but not the GPUs. Teams may elect either to bring their own GPUs or to use the AMD W7900D GPUs provided by the sponsors of the ASC26 Finals. Each server supports up to two GPUs.		

Appendix II

ASC26 Student Supercomputer Challenge:

Technical Regulation and Evaluation Criteria for the Final Stage

Rules of the final stage:

1. The use of optimization methods specifically designed for particular parameters or input datasets is strictly forbidden.
2. If any modifications are made to the algorithm, the revised version must preserve mathematical equivalence with the original.
3. Violation of any of the rules set forth above will result in a zero score for the corresponding task.
4. Carefully assembly of the cluster is essential. Any damage to the server may result in a penalty of up to 20 points being imposed on the team, as determined by the ASC26 Committee.

Note:

Teams may seek prior clarification from the ASC26 Committee regarding any uncertainty as to whether a particular optimization method complies with the competition rules. Such inquiries will be reviewed by the ASC26 Evaluation Committee, which will issue its decision before the commencement of the final competition. Once the competition has begun, no further explanation will be given if an optimization method is ruled ineligible by the ASC26 Evaluation Committee.

Awards and Prizes

Finals		
Award Name	**Bonus (CNY)**	**Rules**
Champion	100,000	The team with the highest total score will be recognized as the winner. Important: The results of the Group Competition will be included in the score calculation.
Silver	50,000	The team achieving the second-highest total score will be recognized as the runner-up. The results of the Group Competition will be included in the score calculation.
e Prize	27,182	The team achieving the highest score in Embodied World Model Optimization will be recognized as this prize winner.
The Highest Linpack	10,000	The team that achieves the highest score in HPL benchmark.
Application Innovation	3×10,000	Each team achieving first place in the scoring of the AMSS-NCKU, QiboTN, and Mystery applications, will be recognized respectively. Note: (1) If a team wins the Champion, Silver, e Prize, or Highest Linpack Award, it shall not be eligible for the Application Innovation Award. In such cases, the Application Innovation Award will be conferred upon the team ranked directly below it, and so forth. (2) If a team achieves first place in two or more applications, the prizes for those applications will be shared with the team ranked directly below it.
Most Popular Team	2×5,000	The team that receives the highest number of votes from online and on-site voting will be recognized: • For teams from mainland China, votes will be counted from both WeChat voting and on-site voting. • For teams from outside mainland China, votes will be counted from both X (Twitter) voting and on-site voting.

Best Presentation Award	10,000	The team that receives the highest number of votes during the Best Presentation selection phase will be recognized as the winner.

Group Competition		
Award Name	**Bonus (CNY)**	**Rules**
Group Competition Award	20,000	1. **Group Formation**: The groups will be announced prior to the finals, with each group consisting of five teams and required to include at least one team from outside mainland China. Any changes to the number of teams or to other relevant arrangements will be made subject to notification by the ASC26 Committee. 2. **Assignment of Teams**: Each team will be assigned a unique ID number, generated randomly. Teams sharing the same ID number will be grouped together. 3. **Competition Application and Workloads**: The Group Competition application will be released within five days following group formation. The workloads for the application will be announced on the first day of the competition. Teams within the same group may collaborate on the completion of the application; however, each team must independently execute and complete the workloads using its own cluster. No cluster may be operated, whether directly or remotely, by members of other teams in the same group. The overall performance of each team within the group will be taken into account in determining the group's final result. 4. **Collaboration and Performance Optimization**: Teams within the same group are permitted to collaborate on hardware equipment, application compilation, debugging, optimization, and technical discussions. The output of each workload must be verified for correctness to ensure validity. The primary objective is to achieve the minimum possible runtime across all workloads.

		5. **Power Consumption Limitations**: Power consumption during runtime must not exceed 5 kW. Any failure to comply with this limit will result in the invalidation of the corresponding team's task.
		6. **Results and Awards**: The results of the Group Competition will be announced on the morning of May 19. The winning group will be awarded the Group Competition Prize together with the corresponding bonuses. The bonuses will be distributed equally among all teams in the winning group.
		7. **Impact on Overall Awards**: The results of the Group Competition will contribute to the determination of the Champion Award and Silver Award recipients.

Performance Optimization (90 points)

I. HPL performance optimization (5 points):
1. **Platform requirement:** Runtime power consumption must not exceed 5 kW. Non-compliance will lead to immediate task disqualification.
2. **Goal:** Obtain the correct results while achieving the highest performance.
3. **Note:** All teams are required to commence the HPL benchmark immediately at the start of May 18, and the results must be submitted no later than 11:00 AM. Teams may access the other application tasks for May 18 only after successfully submitting their HPL results or at 11:00 AM.
4. **Software download:** http://www.netlib.org/benchmark/hpl/

II. Performance optimization of HPCG (5 points):
1. **Platform requirement:** The runtime power consumption must not exceed 5 kW. Non-compliance will lead to immediate task disqualification.
2. **Runtime:** The runtime of HPCG, as recorded in the output file, must be at least 1800 seconds (30 minutes). The Quick Path option is not permitted.
3. **Software download:** https://github.com/hpcg-benchmark/hpcg

III. Performance optimization of Embodied World Model (18 points):
1. **Platform requirement:** The runtime power consumption must not exceed 5 kW. Non-compliance will lead to immediate task disqualification.
2. **Goal:** The Embodied World Model Inference Challenge maintains the same core objective as in the Preliminary Round. However, for the Final Round, provided that PSNR >= 25, the ASC26 Committee has removed all restrictions on weight precision and optimization strategies. Participants are encouraged to explore unrestricted optimizations, including adjustments to the sampler, diffusion steps, and other parameters. Note that the model weights and PSNR calculation scripts remain

consistent with the preliminary round.

3. **Software download:** https://github.com/unitreerobotics/unifolm-world-model-action

IV. **Performance optimization of AMSS-NCKU (18 points):**
   1. **Platform requirement:** The runtime power consumption must not exceed 5 kW. Non-compliance will lead to immediate task disqualification.
   2. **Goal:** AMSS-NCKU is an open, publicly accessible numerical relativity code. The workload for this challenge will be announced by the ASC26 Competition Committee during the finals. The primary goal is to minimize the runtime of the workload while ensuring that all submitted results pass correctness verification. Modifying any code related to method parameters is strictly prohibited. All parameters in the input files must remain unchanged, except for those specifically related to parallelization. Teams are allowed to modify the source code to optimize performance, but the optimized code must be mathematically equivalent to the original one.
   3. **Software download:** https://github.com/ASC-Competition

V. **Performance optimization of QiboTN (18 points):**
   1. **Platform requirement:** The runtime power consumption must not exceed 5 kW. Non-compliance will lead to immediate task disqualification.
   2. **Goal:** This software is a package designed to enable tensor network simulation of quantum circuits within the Qibo ecosystem, which is an open-source full-stack API for quantum simulation and quantum hardware control. Compared to traditional state-vector simulation, which suffers from limited scalability and speed due to the "Memory Wall", tensor network simulation delivers significantly improved scalability and simulation speed thanks to its ability to more efficiently represent complex data and contract tensors via optimized contraction paths. During the final round, the committee will announce several distinct workloads. The objective is to minimize total runtime while ensuring that all submitted results pass the correctness verification. Teams may optimize and parallelize the source code but must not modify the core framework logic, circuit definitions, or any algorithmic components that compromise the physical correctness of the simulation. The results obtained from the state-vector simulator Qibojit are used as reference results for correctness verification. **It is important to note that this application is permitted to run solely on CPUs. Use of GPUs is strictly prohibited, as doing so will result in a score of zero.**
   3. **Software download:** https://qibo.science/qibotn/stable/index.html

VI. **Performance optimization of Mystery Application (18 points):**
   1. **Platform requirement:** The runtime power consumption must not exceed 5 kW. Non-compliance will lead to immediate task disqualification.
   2. **Goal: The ASC26 Committee will announce several Mystery Application workloads before the finals as soon as possible.** The results of each workload must pass correctness verification, and the objective is to achieve the shortest possible runtime. **It is important to note that this application is permitted to run solely on AMD W7900D GPUs.**

VII. **Group Competition (8 points):**
   1. **Application will be posted within 5 days following the group formation.**

2. **Platform requirement:** The runtime power consumption must not exceed 5 kW. Non-compliance will lead to immediate task disqualification

3. **Goal:** During the ASC26 finals, the Competition Committee will release multiple benchmark workloads. Participants will be required to minimize execution time while ensuring that all submitted results pass correctness verification. Modifying any code related to method parameters is strictly prohibited. Teams are allowed to modify the source code to optimize performance, but the optimized code must be mathematically equivalent to the original one. **It is important to note that this application is permitted to run solely on CPUs. Use of GPUs is strictly prohibited, as doing so will result in a score of zero.**

Evaluation Methods:

Applications		Points	Evaluation method
Group competition		8	$\forall S_j \in \{S_1, …, S_N\}$, where N is the number of workloads, S_j is the full score of the jth workload, the score P_{se} of each group will be given as: $$P_{se} = \frac{1}{M}\sum_{i=1}^{M}\sum_{j=1}^{N}(\frac{T_{j\,min}}{T_{ij}} * S_j)$$ Where M is the number of teams in that group, T_{ij} is the runtime of the jth workload achieved by the ith team within that group, and $T_{j\,min}$ is the minimum among all the participating teams. A zero point will be given for the workload which doesn't pass the correctness checking.
Performance Optimization (90 points)	**HPL**	5	Let S_i be the actual performance of each team in which S_{max} is the maximum of all teams, the score P_1 will be given as: $$P_1 = \left(S_i/S_{max}\right) * P_C + P_C$$ Where $P_C = 3.25$ if the team gets correct result, or $P_C = 0$ if the team gets no results or invalid result.
	HPCG	5	P_2 is calculated in the same way as P_1 for HPL.
	Embodied World Model	18	$\forall S_i \in \{S_1, …, S_N\}$, where N is the number of workloads, S_i is the full score of the ith workload, the score P_3 will be given as: $$P_3 = \sum_{i=1}^{N}(\frac{T_{i\,min}}{T_i} * P_s + P_s)$$ Where T_i is the runtime of the ith workload, and $T_{i\,min}$ is the minimum among all the participating teams. Where $P_S = \frac{S_i}{2}$ if the team gets correct result, or $P_S = 0$ if the team gets no results or invalid result.

AMSS-NCKU	18	P_4 is calculated in the same way as P_3
QiboTN	18	P_5 is calculated in the same way as P_3
Mystery Application	18	P_6 is calculated in the same way as P_3
Total Points		$$P = P_{se} + \sum_{i=1}^{6} P_i$$

Team Presentation Requirements and Evaluation (10 points)

The Team Presentation will comprise two parts: the Free Presentation Defense and the Best Presentation Award Selection, both to be held on the morning of May 20.

I. **Free Presentation Defense or Poster Session (10 points):**
  1. Each of the 25 participating teams will deliver its presentation in English in an open-booth format within a large venue. Teams are encouraged to use various forms of media (e.g., PowerPoint presentations and posters) to present their projects and results to the judges, with fellow teams and the on-site audience observing.
  2. The Free Presentation Defense will have a duration of two hours. During this period, each team shall assign one or two members to remain at its booth to present its work to the judges and respond to questions in English. In addition, they will be responsible for introducing and discussing their work with the on-site audience.
  3. Judges are invited to visit each team, examine their displays, and engage in discussion. At the conclusion of the session, the judges will assess each team on a 10-point scale according to the following criteria:
     - Clarity and effectiveness of communication
     - Technical accuracy and depth
     - Innovation in optimizing workloads
     - Adherence to competition guidelines
  4. **The average score assigned by all judges to each team will constitute that team's final defense score and will be included in the calculation of its total score.**

II. **Best Presentation Award Selection:**
  1. **The top three teams from the Free Presentation Defense, together with the two teams receiving the Most Popular Team Award, will proceed to the Best Presentation Award selection.** This phase will not alter the teams' defense scores, but will serve solely to determine the recipient of the Best Presentation Award. The winner will be decided through a vote of all judges**.**
  2. Each of the five selected teams will be allocated 15 minutes for its presentation, followed by 5 minutes for a question-and-answer session.
  3. The presentation materials (e.g., PowerPoint slides, posters, and other supporting materials) and the oral presentation must both be delivered in English, with no more than two student representatives presenting for each team.
  4. The presentation order will be determined by a random draw.
  5. All teams, together with the on-site audience, will be invited to observe the presentations during this phase.