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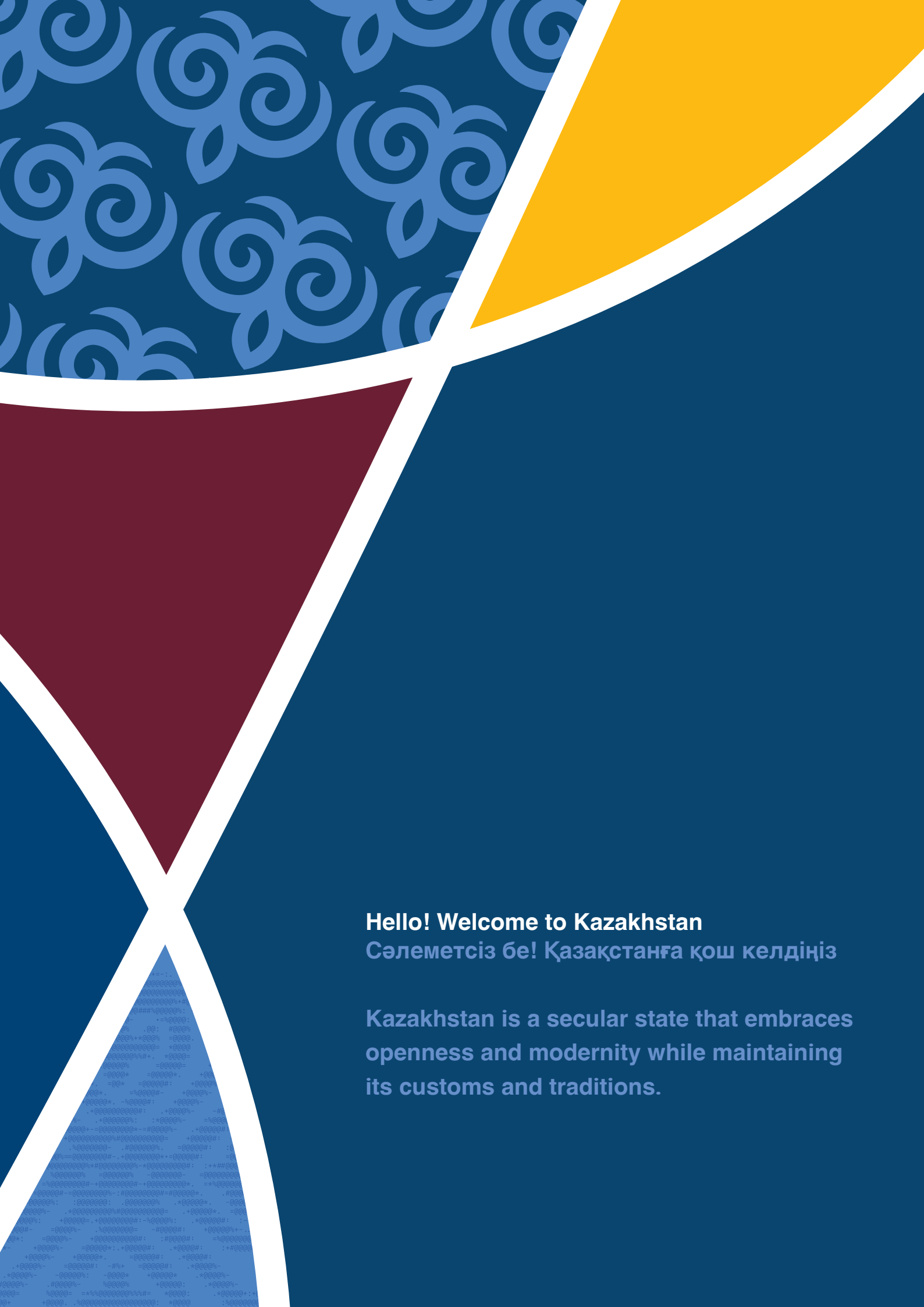


< 15 – 20 SEPTEMBER 2024 >



# ICPC WORLD FINALS < ASTANA >

HOSTED BY  
The Kazakhstan Competitive Programming Federation



**Hello! Welcome to Kazakhstan**

**Сәлеметсіз бе! Қазақстанға қош келдіңіз**

**Kazakhstan is a secular state that embraces  
openness and modernity while maintaining  
its customs and traditions.**

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[worldfinals.icpc.global](http://worldfinals.icpc.global)

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**KAZAKHSTAN**  
COMPETITIVE PROGRAMMING FEDERATION

Developing the human potential of Kazakhstan  
and the world through competitive programming

 [cpfed.kz](http://cpfed.kz)

 [admin@cpfed.kz](mailto:admin@cpfed.kz)

 [t.me/cpfed](https://t.me/cpfed)

 [cpfed.kz](https://www.instagram.com/cpfed.kz)







Welcome



**Bagdat Mussin**

**President of  
the Kazakhstan  
Competitive  
Programming  
Federation**

# Welcome

## from The Kazakhstan Competitive Programming Federation

Dear participants and guests of 2024 ICPC World Finals Astana,

On behalf of the Kazakhstan Competitive Programming Federation, I welcome you to this significant event that brings together the best programmers from around the world. It is a great honor for us to host the ICPC World Finals in Astana and to witness your display of skills and achievements.

Competitive programming is more than just a competition. It is a unique opportunity to develop critical thinking, solve complex problems, and work as a team. These qualities are fundamental for a successful career in IT. Competitive programmers are true intellectual athletes, capable of solving the most challenging problems and creating innovative solutions. They demonstrate a high level of preparation and an ongoing commitment to excellence.

The Kazakhstan Federation for Competitive Programming is actively working to create conditions for the development and support of young talent. We organize regional and national championships, training sessions, and education programs so that everyone can showcase their abilities and reach new heights. We aim for Kazakhstan to become one of the leading countries in the world in the field of IT and programming.

Our country is purposefully moving towards technological leadership on the global stage. We invest in education, support startups, and implement cutting-edge technologies. Kazakhstan envisions its future in building a strong and innovative IT ecosystem that will contribute to sustainable development and prosperity.

Hosting the ICPC World Finals in Astana is an important step on this path. We are confident that this event will be a significant milestone in the development of competitive programming and IT in our country and will help attract global attention to our potential.

I wish all participants good luck and successful problem-solving. May this competition be a source of new knowledge and opportunities for you. Welcome to Kazakhstan, the land of technological possibilities!



**KAZAKHSTAN**  
COMPETITIVE PROGRAMMING FEDERATION



**Timur Turlov**

**CEO of Freedom  
Holding Corp.**

# Welcome

from Freedom Holding Corp.

Dear participants!

I am happy to welcome you to Kazakhstan, one of the largest and most advanced digital hubs in Eurasia. Our country is among the world leaders in the provision of online services and is among the top countries advancing digital solutions on the planet. In many ways, this success has become possible thanks to the development of human capital and a young nation of tech activists. Our ultimate goal is to form a creative society focused on digital growth.

The ICPC World Finals, which is a significant stage in the career development of young IT leaders from all over the world, should contribute to achieving this goal. It is you who will have to create new digital services for millions of users both in large corporations and in your own startups. Perhaps many of you will join the ranks of our company - Freedom Holding Corp., by choosing Kazakhstan for work, building your career and fulfilling your potential.

We have tried to do everything to make these competitions a memorable and bright event for you, a platform for demonstrating your knowledge and skills, a place for new acquaintances, strengthening social bonds and exchanging cultures.

I wish you bright emotions, memorable experiences, new achievements and all the best!





**Zhaslan Madiyev**

**Minister of Digital  
Development,  
Innovations, and  
Aerospace Industry  
of the Republic of  
Kazakhstan**

# Welcome

## from Digital & Space Ministry

Dear participants and guests of the 2024 ICPC World Finals Astana!

The Ministry of Digital Development, Innovations, and Aerospace Industry of the Republic of Kazakhstan welcomes you to the ICPC World Finals, taking place in Astana from September 15 to 20, 2024.

Hosting the ICPC World Finals in our country marks a significant milestone in achieving our ambitious goals in the field of information technology. Competitive programming is not only an exhilarating contest but also a powerful tool for enhancing logical thinking, solving complex problems, and fostering innovation. These are the qualities that the Ministry is dedicated to cultivate in our young professionals.

Today, Kazakhstan is actively working to create favorable conditions for the development of the IT industry. This includes investing in educational programs, providing state support for startup development, and integrating advanced technologies across all sectors. To support these initiatives, IT parks and technological hubs are being established, including in regional areas, where young talents can hone their skills and bring their ideas to life. Additionally, numerous competitions and hackathons are organized to foster interest in programming and innovation.

One of our country's goals is to become one of the world's leading nations in the field of IT. However, achieving this goal is only possible with a qualified workforce capable of solving complex problems and creating the future.

I wish all participants of the ICPC World Finals the best of luck, inspiration, and success in the competition. May this experience be not only a challenge but also a source of new knowledge, ideas, and opportunities.

Welcome to Kazakhstan, a country where dreams of a digital future become a reality!





**Bakhyt T.  
Matkarimov**

**Director of the  
ICPC World Finals  
Astana 2024**

# Welcome

from the Director of the 2024 ICPC World  
Finals Astana

Dear Friends,

On behalf of the Kazakhstan Regional Contest of the Northern Eurasia Regional Contests of the ICPC, it is my pleasure to welcome you to the ICPC World Finals Astana – a true celebration for all who are passionate about competitive programming!

Competitive programming with programming contests is a best way to study an exciting mix of Mathematics, Computer Science and Engineering. Each of you has already demonstrated outstanding abilities and achieved significant success to be here – on a global competitive programming stage. It is my belief that the knowledge, skills, and experience you will receive during this contest will help you to solve actual research problems and to create new technologies and solutions, making our World better! I hope you will never stop in your development and get a taste of both success in competition and recognition in scientific research. Your talents and perseverance are admirable, and I am confident that many more achievements are awaiting you in future!

Hosting the ICPC World Finals in Astana is a significant event for our country, Kazakhstan. It is a great opportunity to showcase our achievements and potential to the World, as well as exchange experiences and start new fruitful collaborations. The ICPC World Finals Astana will be a life source of new knowledge, ideas, and opportunities for all of us – I wish success, inspiration, and unforgettable memories to all participants!

Welcome to Kazakhstan! Enjoy your stay in Astana!





**William B. Poucher**

**ICPC Executive Director  
and ICPC Foundation  
President**



# Welcome

from the ICPC Executive Director  
and ICPC Foundation President

## Welcome to ICPC World Finals Astana here in Kazakhstan!

This season, ICPC Regionals, Workshops, Challenges and outreach contests have hosted 73,083 students with 12,258 coaches and co-coaches at 3,424 universities in 103 countries. Advancing from the Regional Competitions, 141 of the world's strongest collegiate teams of problem solvers will compete at the 48th ICPC World Championship in Astana! Exceptional coaching and over 10,000 volunteers made this happen globally!

Congratulations to these ICPC World Finalists! You outperformed 99% of the teams who challenged you to do your best. What does it take to earn the right to compete in the world's oldest, largest, and most prestigious programming competition? The answer is simple. It takes your very best, together.

Let me introduce you to a few stars of this community that is a major digital services hub in the heart of Eurasia. The support for ICPC World Finals Astana across all of the Kazakhstan community has been stunning.

Thank you, Dr. Prof. Bakhyt T. Matkarimov, ICPC World Finals Director, and the wonderful volunteers of The Kazakhstan Competitive Programming Federation. Thank you to our champions, Madiyev Zhaslan, Minister of Digital Development, Innovations, and Aerospace Industry; Bagdat Mussin, Chairman of the Board of JSC «Kazakhtelecom», Kazakhstan Competitive Programming Federation; and Timur Turlov, CEO and founder of Freedom Holding. Your commitment to future generations will impact lives in this beautiful country and across the globe for decades to come.

Thank you, Huawei, ICPC World Finals Diamond Sponsor, and ICPC Challenge Sponsor! Your continuing support of this community is unparalleled. Thank you, JetBrains, ICPC Global Programming Tools Sponsor, for your steadfast commitment to our global community and the next generation! Both are the champions behind the champions. Your unwavering support allows us to spotlight the world's extraordinary problem solvers bringing dreams to life on a global stage.

It takes steadfast institutional and industry commitment to serve a global community. The UPE Honor Society in Computer Science has served for over 50 years. And to our host, the Kazakhstan Competitive Programming Federation with Danabek Kaliyazhdarov and Adina Madavian leading the way, and to the amazing ICPC Kazakhstan academic community, thank you for creating pathways for this generation to benefit their neighbors.

Congratulations again to our amazing ICPC volunteers, especially to Measures Award winner, Matvey Kazakov, who regularly works a few miracles! And to ICPC DeBlasi Award winner, ICPC News. You shine the global spotlight on ICPC communities year round. And to award winning ICPC Kazakhstan community leaders, for over two decades you have built a magnificent community.

Best wishes from ICPC Friends and Family. Joining our 450,000 ICPC Alumni, you, our ICPC World Finalists, will continue five decades of building the digital capabilities of our civilization! Let's kick start the Digital Millennium to become the definitive Golden Age of prosperity and community. Remember, it is so much more fun to do it together, starting right here in Astana, Kazakhstan! Together, life will flourish!

Best,

*William B. Poucher*



**Orlando  
Madrigal Ph.D.**

**Executive Director  
of UPE**

# Welcome

## UPE Executive Director

Welcome from UPSILON PI EPSILON

On behalf of UPE, computer science honor society, I would like to welcome student teams and their coaches, ICPC support personnel, and guests to the 2024 ICPC World Finals! We are honored and delighted to meet here in Astana, the seat of the government of Kazakhstan and, for most of us, a memorable first visit to the center of the Kazakh Steppe.

The ICPC World Finals is truly a significant event for all of us in UPE. We are privileged to recognize the World's most brilliant students in computing. The World Finals is always an exciting time for UPE as we strive to expound UPE's primary mission to recognize academic excellence in the computing and information disciplines. Thank you for your commitment and support in upholding the ideals of UPE and the ICPC.

The World Finals will show the world that we can provide student participants with new venues and be recognized as the best of the best in the globally competitive world of computing. We encourage everyone to fully experience the historic location and environment of Astana.

Finally, I wish to take the opportunity to say thank you to the organizers and sponsors: the [icpc.foundation](#); the ICPC World Finals Host, the Kazakhstan Competitive Programming Federation; Freedom Holding Corp; and also to ICPC World Finals Diamond Sponsor Huawei, and ICPC Global Programming Tools Sponsor JetBrains.

Enjoy your time at the ICPC World Finals. Dive into the learning opportunities and be sure to make new friends!







**Dr. Zhou Hong**

**President of the  
Institute of Strategic  
Research, Huawei**

# Welcome

from ICPC World Finals Diamond Sponsor,  
Multi-Regional Sponsor, Huawei

It takes wisdom, diligence, and dedication for anyone to arrive at the ICPC World Finals. Allow me to send sincere regards on behalf of Huawei for what you've accomplished here. You've honed your skills, thought a step ahead of your peers, and written some creative, functional and accurate code. Persisting in these activities is truly admirable.

The ICPC guides us with a mature system that has proven highly effective and practical in identifying and promoting top talent like you in the algorithmic field. You've excelled in this ecosystem. Be aware that every single one of you is amazingly capable and holds great potential to bring significant changes to science. I hope you flourish with all you've learned at this platform.

There are some defining moments in our lives that help build our sense of worth. I believe this World Finals will be one such moment. I recommend that you trust that all the time and hard work you've done will pay off; to stay focused; and not to let all the spotlights distract you. Just do what you've been doing thousands times in practice. I wish you all the best of luck!

Huawei will remain your strong ally by providing resources to contestants, coaches, and organizers. We are grateful that many of the contestants and coaches have enjoyed more than 15 editions of ICPC Challenge powered by Huawei in the past few years. We will continue sharing more real-world industrial problems to help you better advance in the STEM field.

A handwritten signature in black ink, consisting of stylized Chinese characters and the letters 'ZHONG'.

Zhou Hong







**Andrey Ivanov**

**SVP of Investments,  
Research and  
Education, JetBrains**

# Welcome

from ICPC Global Programming Tools  
Sponsor, JetBrains

Dear friends,

My name is Andrey Ivanov, and it is my pleasure to welcome you on behalf of JetBrains to the 2024 ICPC World Finals in Astana, Kazakhstan.

This is the third ICPC World Finals to be held in 2024. There has never been more than one ICPC Finals in a single year before. As this is unlikely to ever happen again, we are all part of something quite historic!

JetBrains is honored to be a sponsor of this event, and we are overwhelmed by the talent and passion on display here. As a company committed to investing in the future of the field, we consider the ICPC World Finals a particularly special event.

JetBrains is dedicated to seeking out talented people, supporting their initiatives, and working together to develop great solutions that will make the world a better place. That's why we are proud to be the ICPC Global Programming Tools Sponsor. Many ICPC alumni also work at JetBrains, and together, we've created some fantastic things like the Kotlin programming language, professional software development products like CLion, IntelliJ IDEA, PyCharm, and the newly released AI-powered coding companion AI Assistant, as well as educational tools that help people learn and teach programming.

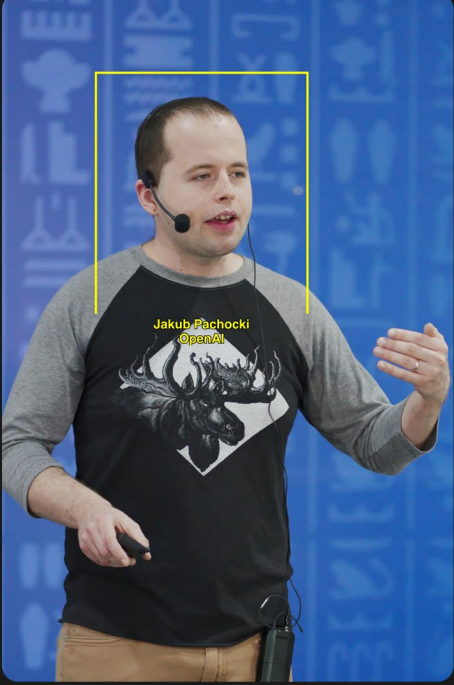
The tools we build are designed to help you achieve your potential and eliminate tasks that take you out of your flow, allowing you to focus on problems that demand your full attention.

Congratulations on qualifying for this prestigious event! Even amidst the grueling competition, we hope you can take some time to enjoy such a major personal accomplishment in the company of your peers. We look forward to following your achievements.

Stop by our booth to meet our team, learn more about our tools, and solve problems in Kotlin with our ICPC World Champion colleagues.





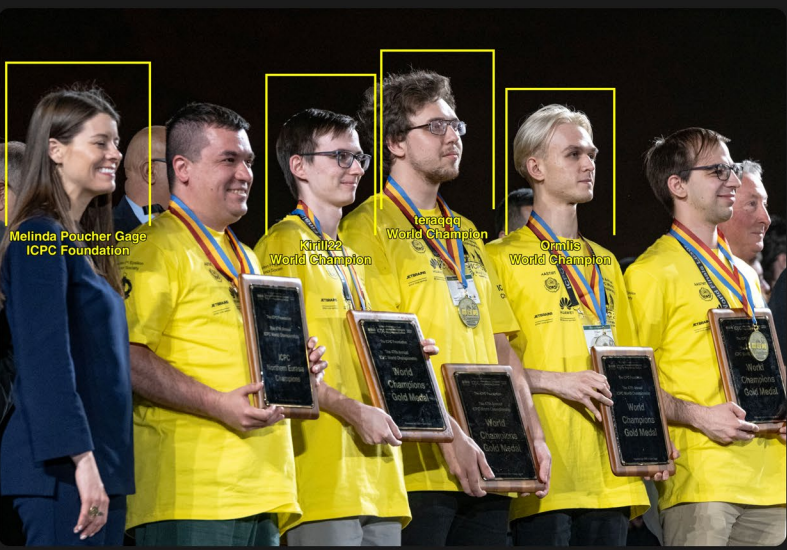
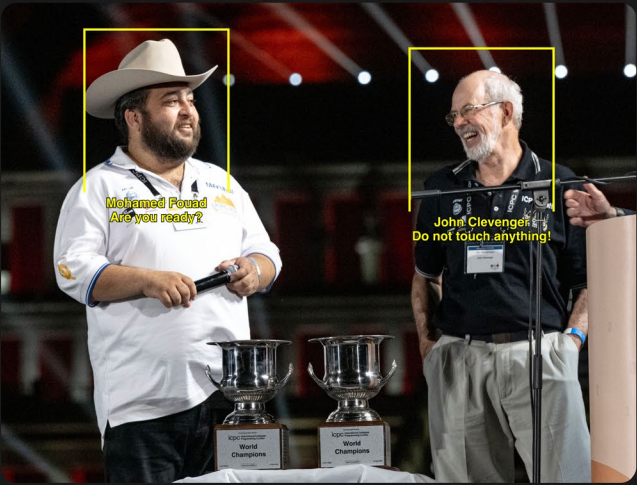


# OFFICIAL PHOTO GALLERY

Find and tag your team!

[news.icpc.global/gallery](https://news.icpc.global/gallery)

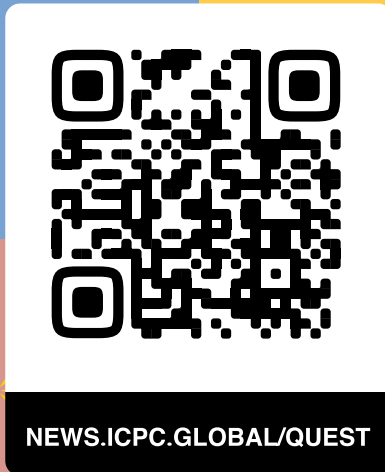
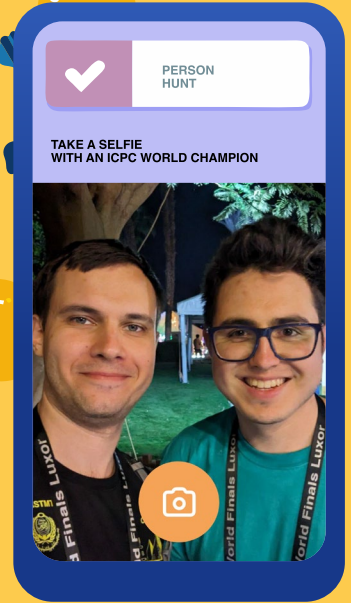
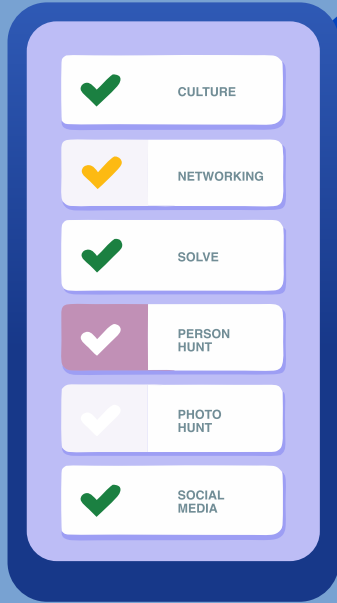
Suggest tags: > > Bill\_ >





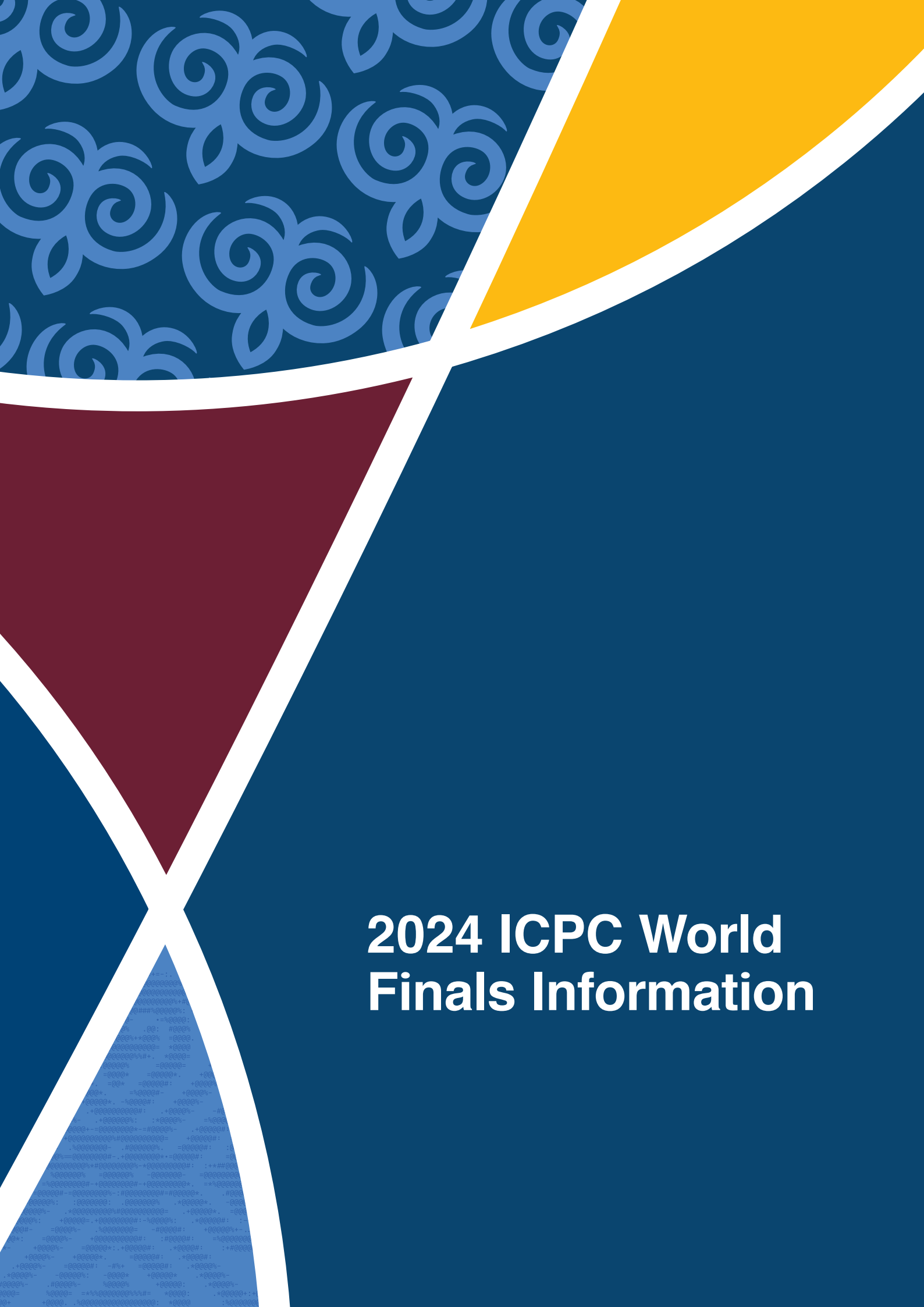
**THINK  
THROUGH  
DAILY QUESTS**

**CREATE  
UNFORGETTABLE  
MEMORIES**



**SOLVE  
MORE QUESTS  
THAN OTHERS**

**WIN  
DAILY AND  
GRAND PRIZES**



# 2024 ICPC World Finals Information

# ICPC World Finals Astana

## < About the Contest >

### What is the ICPC?

The ICPC International Collegiate Programming Contest is the premiere global programming competition conducted by and for the world's universities. The ICPC operates under the auspices of the ICPC Foundation, which hosts ICPC Global Headquarters. We spotlight the students, coaches, universities, industry, and communities working to advance prospects of prosperity through team-based, algorithmic, competitive programming.

For over four decades, the ICPC has grown to be a game-changing global competitive educational program that has raised aspirations and performance of generations of the world's problem solvers in the computing sciences and engineering. With over 400,000 alumni, the ICPC community spans the globe, with recent annual participation levels reaching 10,000+ volunteers, 12,258 coaches and co-coaches serving 73,083 team members representing 3,424 universities located in 103 countries. Even during several years of the COVID pandemic, with limited access to the competition, annual participation continued above 49,000 team members from 2,640 universities in 93 countries.

The ICPC community purpose remains at the heart of the ICPC: to advance prospects for the next generation by bringing students together, working collaboratively to solve algorithmically challenging problems, and preparing them to build dependable systems that benefit their neighbors with the support of universities, industry, and community leaders, globally.

With ICPC principles, "Put people first."; "Practice goodwill." and "Follow the Golden Rule.", the doors are open for students from all universities to compete in ICPC regional competitions with the opportunity to advance to the ICPC World Finals. See the ICPC Code of Ethics.

ICPC World Finals host institutions offer hospitality comparable to visiting grandma's house with special assistance to obtain passports and visas so that all who qualify may participate. The 48th ICPC World Finals in Astana, hosted by The Kazakhstan Competitive Programming Federation, will continue over four decades of global inclusion, advancing participants of any race, ethnicity, gender, religion, or nationality who qualify. The ICPC's purpose remains to uplift each generation on the path of excellence to build systems that benefit their neighbors.

In ICPC competitions, teams of three students represent their universities in multiple levels of regional competition. Volunteer coaches prepare their teams with intense training and instruction in algorithms, programming, and teamwork strategy. Several ICPC universities and ICPC volunteers provide online judging systems free of charge. Top teams from regional competitions held on six continents advance to the annual ICPC World Championship rounds of the ICPC World Finals, hosted by The Kazakhstan Competitive Programming Federation on September 19, 2024, in Astana, Kazakhstan.

To learn more about the ICPC, visit [icpc.global](https://icpc.global)







## The ICPC Community

**400,000+**  
Alumni

**10,000+**  
Volunteers

**12,000+**  
Coaches

**73,000+**  
Team Members

**3,400+**  
Universities

**100+**  
Countries

## History

The ICPC traces its roots to a competition held at Texas A&M in 1970 hosted by the Alpha Chapter of the UPE Computer Science Honor Society. The idea quickly gained popularity within the United States and Canada as an innovative initiative to raise the aspirations, performance, and opportunity of the top students in the emerging field of computer science.

The contest evolved into a multi-tier competition, with the first Finals held at the ACM Computer Science Conference in 1977. Operating under the auspices of the ICPC Foundation and headquartered at Baylor University from 1989 to 2021, the contest has expanded into a global network of universities hosting regional competitions that advance teams to the ICPC World Finals.

The contest fosters creativity, teamwork, and innovation in building new software programs and enables students to test their ability to perform under pressure. It is the oldest, largest, and most prestigious programming contest in the world and the root of competitive programming competitions the world over.

The annual event comprises several levels of competition:

### Local Contests

Universities choose teams or hold local contests to select one or more teams to represent them at the next level of competition. Selection takes place from a field of over 300,000 students in computing disciplines worldwide.

### Regional Contests

Recent ICPC Regional Contests have served 75,000 volunteers, coaches, and team members from 3,450 universities in 111 countries.

### World Finals

September 15-20, 2024, in Astana, Kazakhstan – Hosted by The Kazakhstan Competitive Programming Federation, the ICPC World Finalist teams will compete for World Championship awards, prizes, and bragging rights. These teams represent the best of great universities on six continents - the cream of the crop.



## Battle of the brains

The contest pits teams of three university students against eight or more complex, real-world problems with a gruelling five-hour deadline. Huddled around a single computer, competitors race against the clock in a battle of logic, strategy, and mental endurance.

Teammates collaborate to rank the difficulty of the problems, deduce the requirements, design test beds, and build software systems that solve the problems under the intense scrutiny of expert judges. For a well-versed computer science student, some of the problems require precision only. Others require knowledge and understanding of advanced algorithms. Still, others are simply too hard to solve – except, of course, for the world’s brightest problem-solvers.

Judging is relentlessly strict. The students are given a problem statement – not a requirements document. They are given an example of test data, but they do not have access to the judges’ test data and acceptance criteria. Each incorrect solution submitted is assessed a time penalty. You don’t want to waste your customer’s time when you are dealing with the supreme court of computing. The team that solves the most problems in the fewest attempts in the least cumulative time is declared the winner.

To learn more about the ICPC, please visit [icpc.global](http://icpc.global).

For full coverage of the World Finals, including social media, photos, video, live coverage, and live scoreboard, go to ICPCNews, [news.icpc.global](http://news.icpc.global).



## Contest Growth

The ICPC Foundation and UPE are thrilled that the contest continues to attract the best and brightest worldwide. The ICPC student participation has increased by 2000% in 25 years.

For more information in the previous contests and last year's final standings and problem sets, please see [icpc.global](https://icpc.global).

The 2024 ICPC World Finals in Astana, Kazakhstan, will host the 48th Championship, the final round for the 2023-2024 ICPC Regionals.



## Recent medal winners

### 47th ICPC World Finals Luxor

#### 2023 Gold

National Research University Higher School of Economics  
Peking University  
Moscow Institute of Physics and Technology  
Harbour Space University - Barcelona Campus

#### 2023 Silver

Tsinghua University  
Nanjing University  
Seoul National University  
University of Waterloo

#### 2023 Bronze

The University of Tokyo  
Tokyo Institute of Technology  
Brigham Young University  
University of Warsaw  
Universidad de Buenos Aires - FCEN  
University of Cambridge  
National Taiwan University  
Xi'an Jiaotong University

### 46th ICPC World Finals Luxor

#### 2022 Gold

Peking University  
Massachusetts Institute of Technology  
National Research University Higher School of Economics  
University of Oxford

#### 2022 Silver

Moscow Institute of Physics and Technology  
Seoul National University  
Taras Shevchenko National University of Kyiv  
University of Wisconsin-Madison

#### 2022 Bronze

The University of Tokyo  
Tsinghua University  
Nanjing University of Posts and Telecommunications  
National Taiwan University

### 45th ICPC World Finals Dhaka

#### 2021 Gold

Massachusetts Institute of Technology  
Peking University  
The University of Tokyo  
Seoul National University

#### 2021 Silver

ETH Zürich  
École Normale Supérieure de Paris  
Carnegie Mellon University  
University of Warsaw

#### 2021 Bronze

National Research University Higher School of Economics  
St. Petersburg State University  
University of Oxford  
University of Engineering and Technology - VNU

### 44th ICPC World Finals Moscow

#### 2020 Gold

Nizhny Novgorod State University  
Seoul National University  
St. Petersburg ITMO University  
Moscow Institute of Physics and Technology

#### 2020 Silver

University of Wrocław  
University of Cambridge  
Belarusian State University  
University of Bucharest

#### 2020 Bronze

Massachusetts Institute of Technology  
Kharkiv National University of Radio Electronics  
University of Illinois at Urbana-Champaign  
National Research University Higher School of Economics



## About the ICPC Foundation

**The ICPC Foundation is a 501(c)(3) organization founded to advance the art, sport, and science of competitive programming for the benefit of society.**

The ICPC operates under the ICPC Foundation and is responsible for sponsorship, fundraising, outreach, and operational matters. The ICPC Foundation strives to provide ample opportunity for the underserved, to create a tier of regional championships to recognize far more star performers and showcase emerging talent, and to bring ICPC alumni together, assuring future generations paths of excellence to being great problem solvers. The ICPC Foundation operates programs such as ICPC-U and the ICPC University Commons, which actively create opportunities, especially for the underserved, to pursue excellence within a culture of global inclusion and authenticity.

For more information about the ICPC and the ICPC Foundation, visit [icpc.foundation](https://icpc.foundation)



## Upsilon Pi Epsilon's Commitment

**The Upsilon Pi Epsilon International Computer Science Honor Society recognizes the best computer science and engineering students in the world.**

Since its earliest participation, the UPE has provided support and scholarships to the World Finals teams. The UPE boasts the longest continuous relationship with the ICPC, dating back to 1970, with the first event held at Texas A&M by members of the Alpha Chapter of the UPE.

For more information about other UPE activities, chapters, and membership, visit [upe.acm.org](https://upe.acm.org).





## About Kazakhstan

Rich in history, it was a vital part of the Silk Road, facilitating trade and cultural exchange between East and West.

Kazakhstan, the world's largest landlocked country, boasts diverse and striking natural landscapes, from the vast steppes and deserts to the majestic Altai and Tien Shan mountain ranges. Rich in history, it was a vital part of the Silk Road, facilitating trade and cultural exchange between East and West. The country is home to significant archaeological sites and ancient petroglyphs, reflecting its deep nomadic heritage. Since gaining independence from the Soviet Union in 1991, Kazakhstan has pursued rapid economic development, becoming a leading producer of oil, gas, and minerals. Its major cities, like Almaty and Shymkent, blend modernity with traditional Kazakh culture, showcasing impressive architecture and vibrant cultural scenes. Kazakhstan is also home to the Baikonur Cosmodrome, the world's first and largest space launch facility, playing a crucial role in international space exploration. The nation places strong emphasis on education and technological advancement, evident in its growing IT sector and the development of smart cities. Kazakhstan's natural beauty includes the Caspian Sea, the world's largest inland body of water, and the stunning Charyn Canyon, often compared to the Grand Canyon. Kazakhstan's multiethnic population contributes to a rich cultural mosaic, fostering a unique blend of traditions and modern influences. The country's commitment to environmental conservation is evident in its efforts to restore the Aral Sea and protect its numerous national parks and wildlife reserves.

# ICPC World Finals Astana

## < Contest Rules >

### Mission

The ICPC provides college students with opportunities to interact with students from other universities and to sharpen and demonstrate their problem-solving, programming, and teamwork skills. The contest provides a platform for industry and academia to encourage and focus public attention on the next generation of computing professionals as they pursue excellence.

### Introduction

The contest is a multi-tiered competition among teams of students representing institutions of higher education. Teams first compete in Regional Contests held around the world from September to December each year. Based on their performance in Regional Contests, top-ranking teams advance to the International Collegiate Programming Contest World Finals. Additional high-ranking teams may be invited to the World Finals. At most 140 teams for each contest year will be invited to compete onsite. These rules are subject to change.

### Organization

The ICPC is organized according to the ICPC Policies and Procedures in harmony with the ICPC Code of Ethics and Overview. The Executive Committee, chaired by the Executive Director, sets the policy and general rules for the conduct of the contest. The Executive Director is solely responsible for interpreting the rules and for ruling on unforeseen situations.

### Attendance

Finalists must attend all required events as indicated in the Schedule of Events. Failure to attend any required event could result in disqualification and forfeiture of scholarships and prizes. Coaches must be accessible during On-Site Registration, Dress Rehearsal, the World Finals Championship, and the Closing Ceremony.

## Team Requirements

Teams qualify to advance to the World Finals through Regional Contests. See the ICPC Regional Rules and Region-Specific Rules for details on advancing to the World Finals. Only one team from a given institution may advance to the World Finals. No team member on the qualifying team may have competed as a contestant in two previous World Finals.

The coach of a qualifying team is the point of contact before and during World Finals activities. A contestant of a team may not serve as the coach. The coach must complete certification at the Team Certification Web Site within five (5) business days of notification. Qualifying teams will be invited by email and postal mail (if requested) soon after completing certification.

All team members attending the team's institution on visas must be permitted to return to their point of origin after the World Finals. Qualifying teams requiring visas must initiate the process of applying for visas within 10 business days of being invited to apply for a visa.

Teams failing to comply with any of these requirements will be ruled ineligible to compete in the World Finals. Upon completion of these requirements, a qualifying team will be advanced to the World Finals.

A team advancing to the World Finals will comprise the same three members as when it qualified. (Reserves are not allowed at the Finals.) If a team member is unwilling, unable, or unfit to compete in the World Finals, the coach must notify the ICPC Contest Manager in a timely manner. A team member who is unwilling or unfit to compete in the World Finals will be disqualified from further ICPC competitions. The team member may appeal disqualification to the Appeals Committee.

At On-Site Registration, participants must provide a picture ID (passport, driver's license, etc). Contestants must show proof of enrollment at the university during the term of the regional contest at which they qualified. A letter on university stationery with the signature of a university official accompanied by an English translation is sufficient.

At times, exceptions can take place. See the ICPC Regional Rules for exceptions. All team members are responsible to follow any and all health safety rules.

**See the ICPC Regional Rules and Region-Specific Rules for details on advancing to the World Finals.**

**Only one team from a given institution may advance to the World Finals.**





## Support and Prizes

The ICPC Host will provide each finalist team with hotel accommodations for the coach and three contestants according to dates published on ICPC Host Invitations. The coach should identify any special needs during registration. The ICPC Host will seek to accommodate those needs at a team expense not to exceed the cost of one additional sleeping room. The teams and coaches will be treated to a full schedule of activities including a full course of complimentary food functions.

Transportation to the World Finals host city is the responsibility of the finalists. The ICPC encourages teams to raise funds for transportation and extracurricular activities from local sources to strengthen better community ties among academia, industry, and government.

Teams finishing in the top four positions will be awarded Gold Medals. Those teams finishing fifth through eighth place will be awarded Silver Medals. Those teams finishing ninth through the twelfth place will receive Bronze Medals. Additional Bronze Medals may be awarded to teams solving the same number of problems as the twelfth place team and in a total elapsed time no more than 60 minutes more than the twelfth place team. Such teams will be awarded the twelfth place.

The highest-ranked team is the World Champion and will receive the World Champion Trophy and plaques. The remaining teams through twelfth place, as well as the Africa and Arab Region Champions, the Asia East Champions, the Asia Pacific Champions, the Asia West Champions, the Europe Champions, the Latin America Champions, the Northern Eurasia Champions, and the North America Champions will also receive plaques. Prizes will be awarded in strict compliance with and as permitted by applicable laws governing transactions by prize donors.

## Conduct of the Finals

Ten or more problems have been posed in recent World Finals.

Problems will be posed in English. During the contest, all communications from contest officials to contestants will be in English. Each team may identify an interpreter to translate questions posed by contestants to contest officials. Contestants may bring electronic natural language translators provided that they do not support math operations.

Solutions to problems submitted for judging are called runs. Each run is judged as accepted or rejected, and the team is notified of the results. Rejected runs will be marked with one of the following:

- **compilation error (CE)**
- **run-time error (RTE)**
- **time-limit exceeded (TLE)**
- **wrong answer (WA)**

Notification of accepted runs may be suspended at the appropriate time to keep the final results secret. A general announcement to that effect will be made during the contest. Notification of rejected runs will continue until the end of the contest.

A contestant may submit a claim of ambiguity or error in a problem statement by submitting a clarification request. If the Judges agree that an ambiguity or error exists, a clarification will be issued.

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The competition is scheduled to last five hours. The ICPC Executive Director has the authority to lengthen the contest in the event of unforeseen circumstances. Should the Contest duration be altered, every attempt will be made to notify contestants in a timely and uniform manner.

## Scoring of the Finals

The World Finals Judges are solely responsible for determining the correctness of submitted runs. In consultation with the World Finals Judges, the Director of Judging is responsible for determining the winners of the World Finals. They are empowered to adjust for or adjudicate unforeseen events and conditions. Their decisions are final.

Teams are ranked according to the most problems solved. Teams placing in the first twelve places who solve the same number of problems are ranked first by the least total time and, if need be, by the earliest time of submission of the last accepted run.

The total time is the sum of the time consumed for each problem solved. The time consumed for a solved problem is the time elapsed from the beginning of the contest to the submission of the first accepted run plus 20 penalty minutes for every previously rejected run for that problem (except that there is no penalty for runs rejected due to Compilation Error). There is no time consumed for a problem that is not solved.

**Contestants may bring electronic natural language translators provided that they do not support math operations.**





## Computing Environment

The World Finals programming language tools include Java, C, C++, Kotlin, and Python3. See the [Programming Environment Web Site](#) for detailed configuration information. Before the World Finals, the judges will have solved all problems in languages from at least two of the three distinct language groups (Java/Kotlin, C/C++, and Python3).

Each team will be provided with one computer. All teams will have equivalent computing equipment. Contestants may not bring any printed materials or machine-readable versions of software or data to the Team Area. Contestants may not bring their own computers, computer terminals, calculators, or other electronic devices to the Contest Area.

Each team member may bring an unannotated natural language printed dictionary. Online reference materials will be made available as described in the Reference Materials section of the Programming Environment Web Site. Each team will be permitted three copies of the Team Reference Document described in the On-Site Registration Instructions.

## Contestant Conduct

DO NOT TOUCH ANYTHING at the team workstations until so directed by the World Finals Director.

Contestants are not to converse with anyone except members of their team and personnel designated by the World Finals Director. Systems support staff may advise contestants on system-related problems, such as explaining system error messages.

A team may be disqualified by the World Finals Director for any activity that jeopardizes the World Finals, such as dislodging extension cords, unauthorized modification of contest materials, distracting behavior, or behavior contrary to the ICPC Code of Ethics and Overview.

## Participant Conduct

Any participant may be disqualified from further participation due to any activity that compromises an ICPC event or due to behavior that is not in harmony with the ICPC Code of Ethics and Overview.







**LET  
THEM  
SEE YOU  
SOLVE**

**19  
SEPT**



**#ICPCAstana  
LIVE.ICPC.GLOBAL**

# Show the world your ICPCID!

ICPCID is an official record of your verified participation as an ICPC contestant, coach, or volunteer. By default, nobody can see your ICPCID. Activating your ICPCID will allow everyone to see your ICPC history at [icpc.global](http://icpc.global). Once activated, you can share your ICPCID URL to show your accomplishments.

## Distinguish yourself.



## Activate your ICPCID today!

[https://bit.ly/get\\_your\\_ICPCID](https://bit.ly/get_your_ICPCID)



# Activities

# ICPC World Finals Astana

## < Activities >

### > Team Registration

Provided by the ICPC Foundation, representatives certify that team paperwork and Team Reference Documents comply with ICPC rules. Teams receive their official customized T-shirts, have an official Team Photo taken and participate in interviews. All teams and coaches must present themselves for registration at the time selected by appointments.

### > Participant Welcome

Dinner is hosted by the Kazakhstan Competitive Programming Federation to welcome all registered attendees. Enjoy the networking opportunity with participants of the 48th ICPC World Championship of the International Collegiate Programming Contest.

### > Tech Showcase and Chillzone

This special on-site environment is courtesy of the Kazakhstan Competitive Programming Federation and the ICPC Foundation. It's a great way to learn about new technologies and innovative practices directly from industry visionaries as well as an area to relax, play games, engage with other teams and interact with neat demos featuring varied, innovative technologies, solve challenges that top companies are working on, meet your future colleagues, communicate with ICPC Alumni, relax and discover future opportunities. **Don't forget to bring your business cards!**





## > Tech Trek

Brought to you by ICPC Global Programming Tools sponsor, JetBrains, Tech Trek is a required activity that brings you a showcase of modern software development technologies, leading engineering and educational tools, and so much more.

## > CLI Symposium

Join us to hear from thought leaders in this three-night speaker series co-chaired by Tomas Cerny and Christian Lim. The 2024 Competitive Learning Institute Symposium features a three track structure:

September 15 – **ICPC Library** (Nikolay Kalinin, Riku Kawasaki, Suhyun Park)

September 16 – **ICPC Compete** (Antti Laaksonen, Gennady Korotkevich, Andrey Stankevich)

September 18 – **ICPC Educate** (Erich Baker, Miguel Revilla Rodríguez, Joshua Andersson, Matt Ellis, Christian Lim)

## > ICPC Challenge

The ICPC Challenge powered by Huawei is a required activity that presents a problem from some domains in computing. The domain and problem style may be very different from the standard ICPC problems. This contest provides ICPC participants the opportunity to learn about and experience leading-edge issues in computing, typically of contemporary interest to industry. The ICPC Challenge also provides a platform for ICPC to experiment with new problem types. Get ready for the opportunity to win some amazing prizes provided by ICPC Global Diamond Sponsor Huawei!

# ICPC World Finals Astana

## < Activities >

### > Opening Ceremony

This required event recognizes some of the hundreds of volunteers who have worked to make this year's World Finals a reality and represents the first public introduction of this year's World Finals contestants – the best of the best collegiate programmers.

### > The World Finals Dress Rehearsal

This required event is a full-scale rehearsal and practice of the World Finals. During the Dress Rehearsal, you will have the opportunity to submit questions on the process that will be answered directly afterward at the “Answers to Questions” session, following an open practice slot to apply those learnings.

### > Coaches Award Ceremony

This event celebrates the commitment of ICPC coaches that bring teams to the World Finals for a significant number of years: Lifetime Coach Award (twenty or more years), Senior Coach Award (fifteen or more years), Master Coach Award (ten or more years), Coach Award (five or more years).

### > ICPC Alumni Talk

ICPC World Finals is a unique opportunity to get together, get to know each other better, share knowledge, and help fellow programmers. The ICPC Foundation is honored to announce a presentation by Andrew He, founding member of Cognition AI. We hope it will inspire future masters in this amazing field of work. Don't miss this chance to ask your questions!





## > The World Finals

The time has come. Teams from six continents battle in a five-hour competition to see who takes home this year's prizes, accolades, and bragging rights as the top collegiate programmers in the world.

## > Awards Ceremony

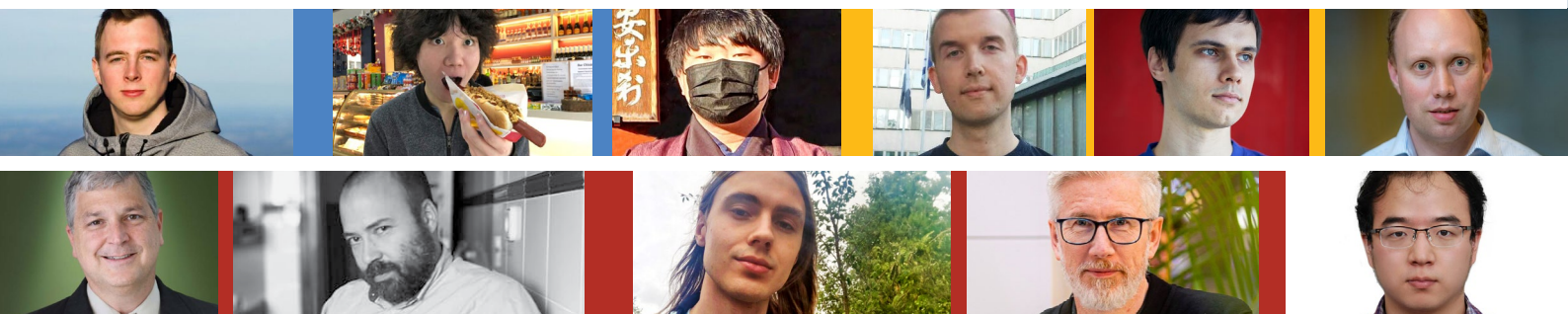
This required event will be held to resolve the last hour of pending submissions, discover the 2024 ICPC World Champions and medal winners, and recognize the ICPC Challenge winners.

## > The World Finals Celebration

Qualifying for the World Finals is no small feat. This night celebrates all teams. Relax, enjoy, and share memories from the week's events in an interactive and fun experience.

# 2024 // CLI Symposium

Co-chaired by  
**Tomas Cerny  
& Christian Lim**



## ICPC Library

A living library of ICPC history, including news, analytics, problem sets, solutions, judge archives, contest archives, awards, and other artifacts of ICPC history.

PRESENTERS

**Nikolay Kalinin**  
[KAN](#)

Max Planck Institute for the  
Science of Light / Codeforces

**Riku Kawasaki**  
[maroonrk](#)

The University of Tokyo

**Suhyun Park**  
[shiftpsh](#)

Sogang University /  
Solved Company

//

**September 15, 2024**

8:00pm – 9:30pm  
Rixos Hotel – D-Hall

## ICPC Compete

Competitive programming competitions at different levels, including news, instructions, and tools for entering ICPC contests, ICPC endorsed contests, and practice contests.

PRESENTERS

**Antti Laaksonen**  
[pllk](#)

University of Helsinki

**Gennady Korotkevich**  
[tourist](#)

**Andrey Stankevich**  
[andrewzta](#)

ITMO University

//

**September 16, 2024**

8:00pm – 9:30pm  
Rixos Hotel – D-Hall

## ICPC Educate

Tools and resources for learning about competitive programming, including scholarly works, tutorials, algorithms from theory to application, strategies, coaching methods, and programs for quick development.

PRESENTERS

**Erich Baker**

Belmont University

**Miguel Revilla Rodriguez**

OJBooks

**Joshua Andersson**

[Matistjati](#)

Chalmers University of Technology

**Matt Ellis**

JetBrains

**Christian Lim**

[yongwoods](#)

Fun.xyz / Columbia University

//

**September 18, 2024**

4:30pm – 6:30pm  
EXPO – Spotlight Stage

The 2024 ICPC World Finals | Astana

# icpc challenge



## IN ASTANA

This Challenge will be based on Large Language Models. LLM is a trending topic in today's tech world. Training a powerful LLM requires not only high-quality datasets, but also massive computing power. This challenge offers you an opportunity to create an algorithm that will be used for allocation of a model on a computer cluster, with the goal of achieving optimal utilization of a cluster's resources.

**ICPC Challenge Contestants will be separated into two areas;** Coaches can participate in the Coaches Viewing area, located at the Spotlight Stage at the EXPO, and World Finals participants will be competing in the Team Area that will be used for the 2024 ICPC World Finals.

Prizes will be awarded to Teams & Coaches ranking in the 1st, 2nd, and 3rd positions (4 teams per rank), and the top 6 coaches will also be rewarded.

We wish all contestants the best of luck during both this Challenge, and the 2024 ICPC World Finals!

We look forward to welcoming you to the **2024 ICPC Challenge powered by Huawei**, which will take place on **Tuesday, September 17th from 11am-2pm.**

local time (UTC/GMT+5)



## AT HOME

Please watch your emails for information on our upcoming ICPC Challenge powered by Huawei, tentatively scheduled for late October.





The 2024 ICPC World Finals | Astana

# icpc challenge

powered by



The ICPC Challenge powered by Huawei provides an opportunity for the ICPC community to experience training, practice and performance in new problem areas that showcase emerging technologies addressing contemporary issues. The Challenge fosters extra-curricular development of university students, faculty, and alumni. We look forward to seeing all teams and coaches during the Challenge on September 17, 2024.







# The Hosts



# ICPC World Finals Astana < Host & Venues >



## About the Host

# Kazakhstan Competitive Programming Federation

The Competitive Programming Federation, a republican public association, was established with the support of Bagdat Mussin, together with the representatives of the Digital Nomads Kazakhstan IT community and the country's leading experts in competitive programming.

The main goal of the Federation is to popularize and develop competitive programming among the population, as well as to improve the results of Kazakh coders in various contests. Through various initiatives, including workshops, training camps, and competitions, the Federation aims to inspire and nurture the next generation of programming talent in Kazakhstan. By promoting competitive programming at all educational levels, from schools to universities, the Federation strives to create a continuous flow of skilled programmers who can contribute to the country's digital transformation.

Furthermore, the Federation works closely with international bodies to provide Kazakh programmers with opportunities to participate in global contests, enhancing their skills and exposing them to diverse programming challenges. The ultimate objective is not only to achieve higher rankings in international competitions but also to build a robust IT ecosystem that supports the country's ambitious goals in digital development and innovation.

## World Finals Information The Host



### About the Host City

## Astana

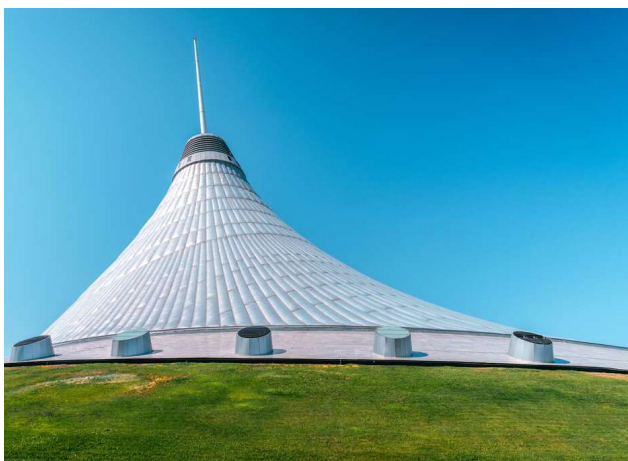
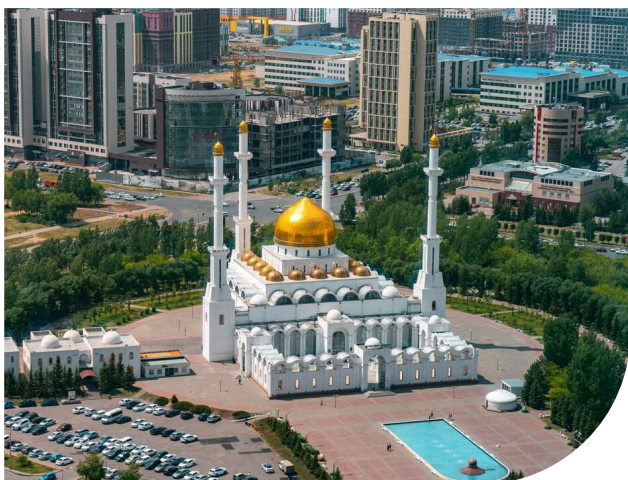
Astana is not just the capital of Kazakhstan, it's a metropolis that dazzles with its grandeur and modernity. It boasts unique architecture, impressive skyscrapers, and vast open spaces beckoning exploration and discovery. Astana is a symbol of rapid development and cultural diversity, a place where the grandeur of the past meets the boldness of the future.

The city is primarily known for its unusual architecture. The most eye-catching buildings are Khan Shatyr (the first lifestyle center in Astana), the Palace of Peace and Reconciliation, and the Nur Alem Museum of Future Energy. The first two were designed by world-famous architect Sir Norman Foster. In August 2022, the largest mosque in Central Asia and one of the largest mosques in the world opened its doors to worshippers. Moreover, the city center contains the Baiterek Monument which is considered to be the symbol of Astana.

More information about the attractions: [worldfinals.icpc.global/astana.html](http://worldfinals.icpc.global/astana.html)



visitastana.kz



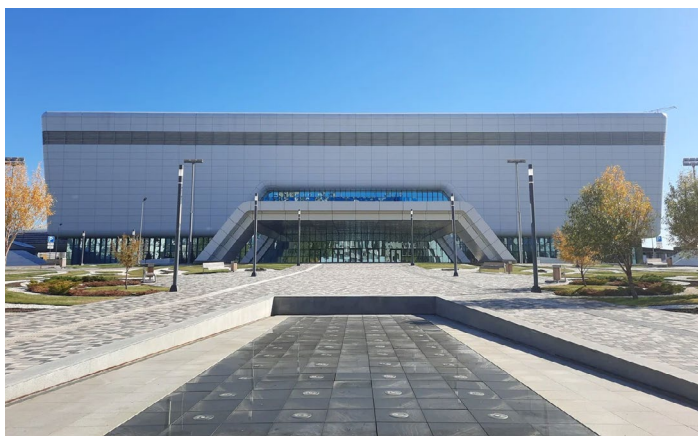




About the Host Venues

## EXPO International Exhibition Center

Built for the 2017 EXPO, Expo International Exhibition Center has become a symbol of sustainable development and innovative technologies. The center regularly hosts major international exhibitions and events, making it an ideal location for the 2024 ICPC World Finals.



## Presidential Center of the Republic of Kazakhstan

The subject of the Presidential Center's activity is library and bibliographic, archival, information and reference, research, scientific and methodological, scientific and collection, cultural and educational and image support for the operation of the museum collection and the personal library of the President of the Republic of Kazakhstan, museum collections, personal libraries and personal archives of former Presidents of the Republic of Kazakhstan.



## Congress Center

With modern amenities and a focus on high-quality service, the Congress Center provides a comfortable and effective environment for all participants of the 2024 ICPC World Finals. Its central location and excellent facilities make it a prime venue for this prestigious event.

## World Finals Information

### The Host



### About the Host Hotels

## Hilton Astana

Hilton Astana is a luxurious hotel located in the heart of Kazakhstan's capital, offering exceptional amenities and services for both business and leisure travellers.

With its modern design, spacious rooms, and stunning views of the city, Hilton Astana provides an unparalleled experience of comfort and elegance.



Free WiFi

Wellness Spa

Rooftop Bar

Indoor pool

Fitness Center





## World Finals Information

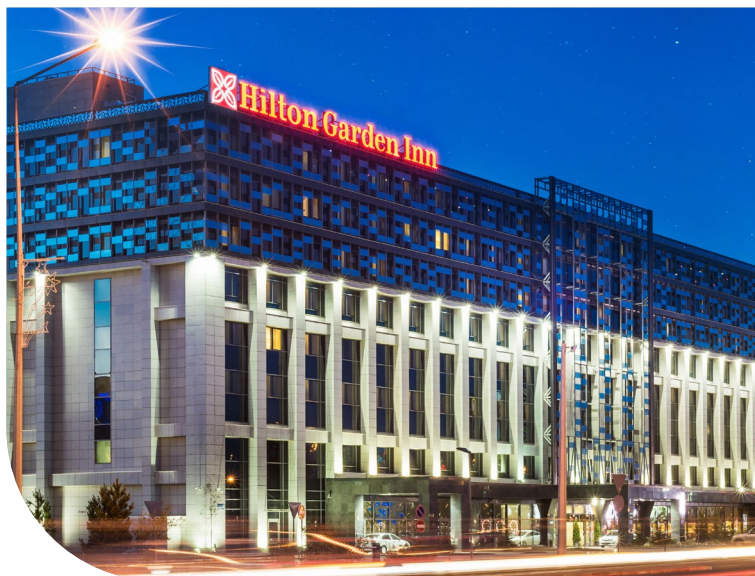
### The Host



### About the Host Hotels

## Hilton Garden Inn

Hilton Garden Inn Astana is strategically located in the heart of Astana, offering convenient access to major attractions and business hubs. The hotel is within walking distance to the iconic Bayterek Tower, the vibrant Khan Shatyr Entertainment Center, and the Palace of Peace and Reconciliation. Guests can enjoy modern amenities, comfortable rooms, and a welcoming atmosphere, making it an ideal choice for both business and leisure travellers exploring Kazakhstan's dynamic capital.

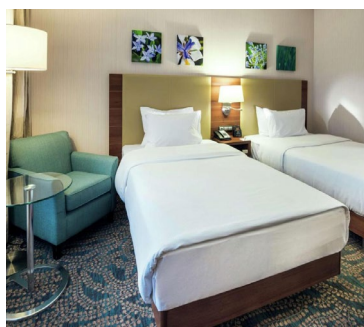


Free WiFi

Fitness center

24-hour front desk

Room Service

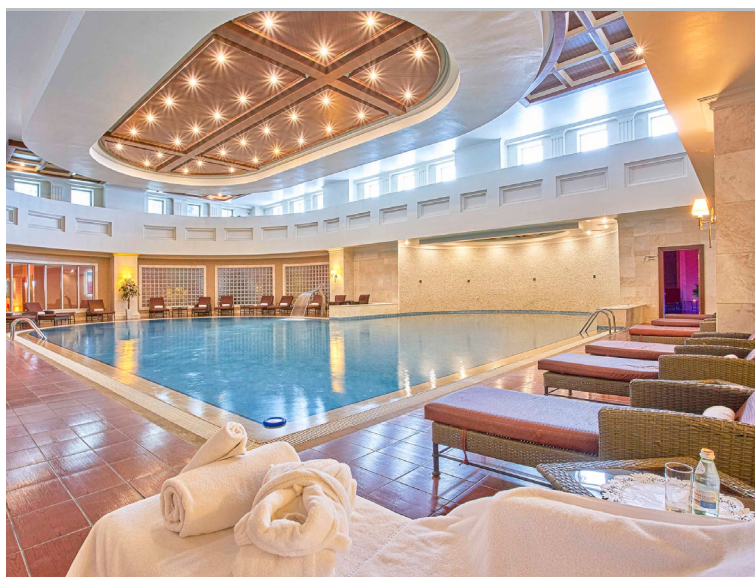




About the Host Hotels

## Rixos President Astana

Rixos President Astana offers a supremely luxurious holiday experience with its superior quality and excellence in the capital of Kazakhstan. Rixos President Astana is located in the new administrative and business centre of Kazakhstan's capital city close to the Bayterek Tower. A city of futuristic architecture, Astana is a modern city with malls, a singing fountain and several examples of spectacular contemporary architecture designed by globally renowned architects. With its central location and superb facilities, the Rixos President Astana promises an excellent holiday experience with everything you would expect from Rixos luxury; a Rixos spa, excellent quality restaurants & bars and the perfect organisation of meetings and events.

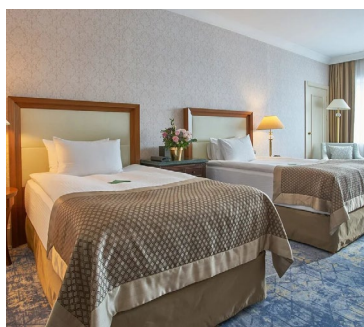


**Room Service**

**Spa**

**Restaurants & Bars**

**Breakfast**



About the Host Hotels

# Beijing Palace Soluxe

This 5-star hotel boasts a 24-hour front desk, bar, spa and wellness center all in the heart of Astana.

Room Service

Free WiFi

Indoor Pool

Fitness Center

Restaurant

Laundry





About the Host Hotels

## SAAD Astana

The Astana Saad Hotel, located in the heart of the business and cultural life on the left bank, offers accommodations in high-class rooms and unparalleled service.

The hotel is just a few minutes' drive from the International Airport and the city's main attractions, including the Bayterek Monument, the Opera and Ballet Theater, the Khan Shatyr Shopping Center, and the Water-Green Boulevard.

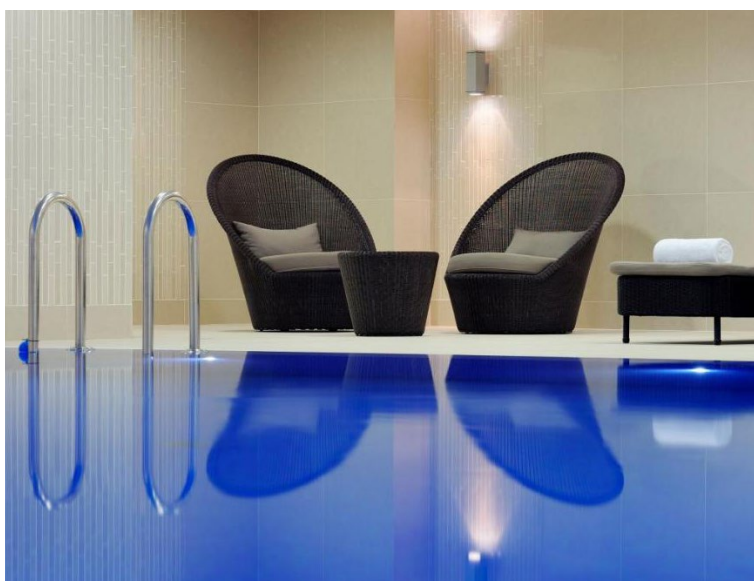


Indoor swimming pool

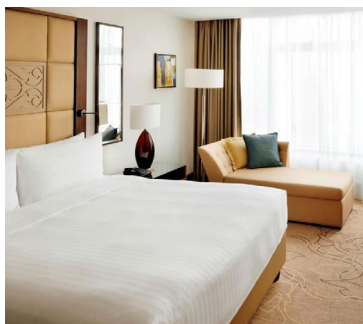
Free WiFi

Fitness center

Panoramic city views



# Saad





## World Finals Information

### The Host



### About the Host Hotels

## Wyndham Garden Astana

Wyndham Garden Astana hotel combines business with pleasure, and pairs amazing onsite amenities with convenient access to the airport, Nazarbayev University, Astana attractions, and the EXPO Exhibition Center.



Free WiFi

24-Hour Room Service

Spa – Italian Sauna, Turkish bath and steam room

Cafe

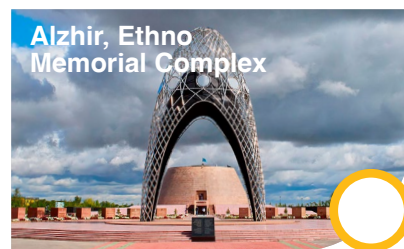
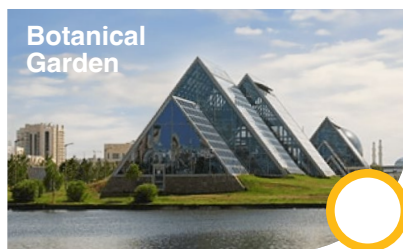
Game Room

Gym

Bicycle Rental



# ICPC World Finals Astana < Must-Experience Checklist >





# Organizers and Sponsors



# ICPC World Finals Astana < Organizers and Sponsors >



## The ICPC Foundation

The ICPC Foundation advances the art and sport of competitive programming. The ICPC Foundation is a 501(c)(3) charity. According to ICPC Policies and Procedures, the ICPC Foundation is responsible for sponsorship, hosting, fundraising, outreach, and operational models in adherence to ICPC Policies and Procedures and the ICPC Foundation Constitution and By-Laws. The ICPC Foundation Board has served the ICPC community for over 250 years out of a love for the community's impact on the next generation, and a willingness to step forward on behalf of the ICPC.

[icpc.foundation](http://icpc.foundation)



## Upsilon Pi Epsilon

The Upsilon Pi Epsilon International Computer Science Honor Society recognizes the best students of computer science and engineering from around the world. Since it began participating, the UPE has provided support and scholarships to the World Finals teams. The UPE boasts the longest continuous relationship with the ICPC, dating back to 1970 when the first event was held at Texas A&M by members of the Alpha Chapter of the UPE.

[upe.acm.org](http://upe.acm.org)



ICPC Diamond World Finals Sponsor

## Huawei

Founded in 1987, Huawei is a leading global provider of information and communications technology (ICT) infrastructure and smart devices. We have more than 197,000 employees and operate in over 170 countries and regions, serving more than three billion people around the world.

Our vision and mission is to bring digital technology to every person, home and organization for a fully connected, intelligent world. To this end, we will drive ubiquitous connectivity and promote equal access to networks; bring cloud and artificial intelligence to every corner of the earth to provide superior computing power where you need it, when you need it; build digital platforms to help all industries and organizations become more agile, efficient, and dynamic; redefine user experiences with AI, making it more personalized for people in all aspects of their lives, whether they're at home, in the office, or on the go.

[huawei.com](http://huawei.com)



ICPC Global Sponsor Programming Tools

## JetBrains

JetBrains is a global software company that creates professional software development tools and advanced collaboration solutions trusted by more than 15 million users worldwide. Since 2000, we have built a product catalog that covers all stages of the software development cycle, major technologies, programming languages and educational processes.

As developers of the Kotlin programming language and creators of professional development products like IntelliJ IDEA, CLion, and PyCharm, as well as educational tools that help people learn and teach computer programming, we are dedicated to supporting individuals throughout their software development journeys. Sponsoring ICPC has special significance for JetBrains and aligns with our commitment to nurturing promising young talent and working with the brightest minds.

Visit [jb.gg/icpc](http://jb.gg/icpc) to learn about JetBrains' involvement with the ICPC and find materials on how the company supports the brilliant minds of the ICPC community.

[jetbrains.com](http://jetbrains.com)



Host Organizing Sponsor

## Freedom Holding Corp.

Freedom Holding Corp. is a US-based financial services holding company. The Company has retail locations in 21 countries: the United States of America, Kazakhstan, Uzbekistan, Kyrgyzstan, Cyprus, Germany, the United Kingdom, Greece, Spain, France, Poland, Austria, Bulgaria, Lithuania, Italy, Netherlands, Belgium, Turkey, Armenia, Azerbaijan, and the United Arab Emirates.

In Eurasia, the company is developing a digital ecosystem under the Freedom brand. The ecosystem already provides services in the field of investment banking and stock market brokerage, digital banking, online insurance, telecommunications, air and event ticket sales, digital car service, smartphone sales and other areas.

The ecosystem includes 12 companies: Freedom Broker, Freedom Bank, Freedom Insurance, Freedom Life, Freedom Mobile, Freedom Pay, Freedom Ticketon, Freedom Drive, Freedom Telecom, Aviaata, Arbuz.kz and re:Kassa.

[freedomholdingcorp.com](http://freedomholdingcorp.com)





# FREEDOM HOLDING CORP.

## One Brand, thousands of capabilities!



[ecosystem.ffin.kz](http://ecosystem.ffin.kz)





**JETBRAINS**

# A Passion for Problem-Solving

Because great things  
won't build themselves



## Free Educational Licenses

Learn or teach coding with best-in-class  
development tools from JetBrains



## Kotlin for Education

Teach Kotlin with our free  
ready-made curriculum



# The Judges



# ICPC World Finals Astana

## < Judges >



**Jo Perry**

NC State University  
Director of Judging since 2010  
World Finals Judge since 1988

The Judging Team has done its best to create problems that are both a challenge and a delight to everyone. And for the contestants: We are rooting for you to do your very best. We are your biggest (and sometimes loudest) cheerleaders.



**John Bonomo**

Westminster College  
World Finals Chief Judge since 2010  
World Finals Judge since 2002

“Good luck to all the teams. Here’s where all your hard work will pay off!  
And don’t forget – owl be watching you!”



**Arnav Sastry**  
Jump Trading  
World Finals Judge since 2020

“As the problems get harder, the teamwork becomes more important. Good luck, and have fun!”



**Paul Wild**  
University of Erlangen-Nürnberg  
World Finals Judge since 2023

“Programs are proofs, and programming is proving.”



**Matthias Ruhl**  
World Finals Judge since 1997

“Good luck in the contest! Don’t let the code bugs bite. And the best wishes for your future careers! This is an exciting time to be in computer science - learn as much as you can, build something great and change the world!”



**Walter Guttman**  
University of Canterbury  
World Finals Judge since 2011

“Every problem in our set has an answer, you can bet. Code it quick if you can find it, else move on and never mind it.”



**Yujie An**  
Google  
World Finals Judge since 2022

“Start with a simple approach, and add optimizations. Keep an open mind, and never give up.”



**Michal Svargerka**  
HFT crypto startup / ETH Zürich  
World Finals Judge since 2019

“Everything can be solved in  $O(1)$  when the input is bounded.”





## Martin Kacer

Czech Technical University in Prague  
World Finals Judge since 2003

“Solve the problems in this contest to get ready for future real-life problems. Today’s world has many challenges to be solved --- maybe they’re waiting for you!”



## Gennady Korotkevich

World Finals Judge since 2024

“Every year since 2017, I solved the ICPC World Finals mirror on stream. Time for a change!”



## Derek Kisman

Apple  
World Finals Judge since 2004

“Practice outside your comfort zone, and your comfort zone will grow...”



## Per Austrin

KTH Royal Institute of Technology,  
Stockholm

World Finals Judge since 2008

“Solve the problems in this contest to get ready for future real-life problems. Today’s world has many challenges to be solved — maybe they’re waiting for you!”



//  
If you would like to be considered as a future ICPC World Finals Judge, please reach out to [jo.perry@gmail.com](mailto:jo.perry@gmail.com) for problem submission guidelines.



**Think. Create. Solve. Connect.**

Connect to the conversation.



# ICPCNews

news.icpc.global

## #ICPCAstana



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[youtube.com/icpcnews](https://youtube.com/icpcnews)



[@icpcnews](https://instagram.com/icpcnews)

**Ask friends and family back home to follow and share!**





# Leadership Awards

The ICPC Foundation

# Mark Measures Distinguished Service Award

Presented to



## **Matvey Kazakov** ICPC Global Volunteer Leader

As a globally recognized volunteer leader, Matvey has served the ICPC community for 25 years, playing key roles in the structure, organization, and evolution of ICPC Global events and the ICPC community in Northern Eurasia. Matvey has served as ICPC Northern Eurasia Director of Operations since 1999, as the 2019 Executive Director of Northern Eurasia Contests as part of ICPC Global Headquarters, and he has served with distinction during extraordinary times as the ICPC World Finals Director of Operations since 2015. In service and dedication to excellence, Matvey embodies the ideals of the ICPC.

Presented at the 2024 ICPC World Finals,  
September 2024, Astana Kazakhstan

The Mark Measures Distinguished Service Award is presented annually to a person or group who has played an instrumental role in the success of the ICPC for fifteen or more years.

The ICPC Foundation

# Joseph S. DeBlasi Outstanding Contribution Award

Presented to



**Artem Iglikov**

For his exceptional achievements as Technical Director of the Kazakhstan Regional Contest, Artem has proven himself to be an outstanding professional who ensured the flawless organization and conduct of the competition. His technical skill and attention to detail contributed to the creation of conditions for fair and successful participation of teams. Artem has made an invaluable contribution to the development and popularization of the ICPC in Kazakhstan.

Presented at the 2024 ICPC World Finals,  
September 2024, Astana Kazakhstan

The Joseph S. DeBlasi Outstanding Contribution Award is presented annually to a person or group who has played an instrumental role in the success of the ICPC for five or more years.

The ICPC Foundation

# Joseph S. DeBlasi Outstanding Contribution Award

Presented to



**KAZAKHSTAN**  
COMPETITIVE PROGRAMMING FEDERATION

**Bagdat Mussin**  
President of the  
Kazakhstan Competitive  
Programming Federation  
Chairman of the Board  
of JSC «Kazakhtelecom»

For his outstanding contribution to the development of ICPC, Bagdat Mussin has distinguished himself as a leader who inspires young talents and contributes to the strengthening of IT education in Kazakhstan. His efforts have led to a significant increase in student participation in international competitions, which has strengthened our country's position on the world stage. His dedication and contribution to the preparation of future leaders in the field of information technology are highly valued.

Presented at the 2024 ICPC World Finals,  
September 2024, Astana Kazakhstan

The Joseph S. DeBlasi Outstanding Contribution Award is presented annually to a person or group who has played an instrumental role in the success of the ICPC for five or more years.



The ICPC Foundation

# Joseph S. DeBlasi Outstanding Contribution Award

Presented to



## Danabek Kaliazhdarov

For his exceptional contribution to the organization of the ICPC World Finals Astana, Danabek demonstrated outstanding leadership and professionalism, ensuring high standards of the event. Danabek was a participant in the ICPC competitions, and later a team coach. His commitment to the cause and significant contribution to the development of the global IT community are respected.

Presented at the 2024 ICPC World Finals,  
September 2024, Astana Kazakhstan

The Joseph S. DeBlasi Outstanding Contribution Award is presented annually to a person or group who has played an instrumental role in the success of the ICPC for five or more years.

The ICPC Foundation

# Joseph S. DeBlasi Outstanding Contribution Award

Presented to



## The ICPCNews Team

Amanda Sturgill  
Bettina Johnson  
Hans Domjan  
Katie Allison  
Matthew Lozano  
Bob Smith  
Michael Roytek

Daniel Beard  
Chris Kirkham  
Randy Piland  
Clara Ritger  
Lucy Sturgill  
Fadi Ashy

The ICPC Foundation recognizes the team from ICPCNews for playing an instrumental role in the success of the ICPC. Stretching for more than two decades, the ICPCNews team works to enact ICPCs goal to “spotlight the students, coaches, universities, industry, and communities working to advance prospects of prosperity through team-based, algorithmic, competitive programming.” ICPCNews staff are media professionals who volunteer their time and sacrifice paid work in order to advance the ICPC. Their work involves telling the stories of the competitors and the contest in video, photography and social media for a global audience in excess of half a million.

Presented at the 2024 ICPC World Finals,  
September 2024, Astana Kazakhstan

The Joseph S. DeBlasi Outstanding Contribution Award is presented annually to a person or group who has played an instrumental role in the success of the ICPC for five or more years.

The ICPC Foundation

# James Comer

## Distinguished Regional Contest Director Award

Presented to



**Bakhyt Matkarimov**

For his outstanding contribution to the development of ICPC in Kazakhstan and his long-term work as a Regional Contest Director, Bakhyt Matkarimov deserves special recognition. As the founder of ICPC competitions in Kazakhstan and the Director of the ICPC World Finals Astana, he played a key role in putting Kazakhstan on the world IT map. His more than 20 years of work and dedication inspire a new generation of programmers and strengthen international cooperation.

Presented at the 2024 ICPC World Finals,  
September 2024, Astana Kazakhstan

The James Comer Distinguished Regional Contest Director Award is presented annually to an ICPC regional leader who has played instrumental roles in the success of the International Collegiate Programming Contest for twenty or more years.

The ICPC Foundation

# C.J. Hwang Distinguished Regional Leadership Awards

Presented to



## ICPC Northern Eurasia RCDs

Vladimir Parfenov  
Roman Elizarov  
Georgiy Korneev  
Andrew Stankevich  
Matvey Kazakov  
Lidia Perovskaya

Vahram Dumanyan  
Bakhyt Matkarimov  
Antonina Fedorova  
Magaz Asanov  
Katsiaryna Paziura

The collective contributions of this team have profoundly influenced the ICPC Northern Eurasia Region community, driving both student inspiration and advancements in software technology. Their proactive engagement with the ICPC has been essential in providing a range of opportunities and fostering a thriving environment for computing talent in the region over the past 28 years.

Presented at the 2024 ICPC World Finals,  
September 2024, Astana Kazakhstan

The C.J. Hwang Distinguished Regional Leadership Award is presented annually to a group of ICPC regional leaders who have played instrumental roles in the success of the International Collegiate Programming Contest.



The ICPC Foundation

# Jo Perry

## Outstanding Judge Award

Presented to



**Walter Guttman**  
University of Canterbury  
World Finals Judge since 2011

Walter Guttman does what is asked of every ICPC Finals judge: create new problems, solve and refine others, generate and validate test data, and more. He is a delight to work with, always completing his work carefully and on time. Plus, he has been the judge team's most diligent editor, going over and over problems to find overlooked errors, ranging from simple typos to confusing inconsistencies. Thank you, Walter, for helping make ICPC Finals contests extraordinary, innovative, and solid.

Presented at the 2024 ICPC World Finals,  
September 2024, Astana Kazakhstan

The ICPC Foundation Jo Perry Outstanding Judge Award is presented to an individual that has played an instrumental role in the success of the International Collegiate Programming Contest by being a regular contributor to the contest problem set and by bringing innovations to the judging process.

The ICPC Foundation

# Outstanding Global Service Award

Presented to



**Huawei**  
ICPC World Finals  
Diamond Sponsor  
2024 ICPC World Finals Astana

For serving as Diamond ICPC World Finals Sponsor, powering the ICPC World Finals Challenge, supporting ICPC Regionals throughout multiple ICPC Regions, and enabling the development of free workshops to engage the talent capable of developing engines of prosperity and mission-critical platforms in service to communities globally.

Presented at the 2024 ICPC World Finals,  
September 2024, Astana Kazakhstan

The ICPC Foundation Global Service Award is presented for global contributions to the success of the International Collegiate Programming Contest global community in keeping with the mission of the ICPC Foundation to advance the art and sport of competitive programming.

The ICPC Foundation

# Outstanding Global Service Award

Presented to



**JetBrains**  
ICPC Global Programming  
Tools Sponsor

For serving as ICPC global programming tools sponsor, for providing outstanding programming tools for the ICPC global community, for sponsoring ICPC Regional and World Championship Contests, for generous support for the ICPC World Finals Astana, and championing the ICPC community.

Presented at the 2024 ICPC World Finals,  
September 2024, Astana Kazakhstan

The ICPC Foundation Global Service Award is presented for global contributions to the success of the International Collegiate Programming Contest global community in keeping with the mission of the ICPC Foundation to advance the art and sport of competitive programming.

The ICPC Foundation

# Outstanding International Contribution Award

Presented to



**KAZAKHSTAN**  
COMPETITIVE PROGRAMMING FEDERATION

## The Kazakhstan Competitive Programming Federation

Bakhyt Matkarimov	Anna Dunayeva
Danabek Kaliazhdarov	Anastasia Dunayeva
Adina Magavina	Begaidarova Aigerim
Alina Dvoretzkaya	Alexei Bogatov
Adil Yessim	Artem Bassov
Diana Kislitsyna	Aruzhan Kramsheyeva
Daniyal Shulembayev	Rayimbek Nagashybay
Sulu Abdikerim	Ashimbek Abilgazinov
Tolkyn Nauryzbayeva	Talgat Bakushev
Aliya Kaliazhdarova	Kaisar Abdykassym
Yersultan Yermanov	Edil Nurakhov
Tantashev Arthur	

The Kazakhstan Competitive Programming Federation deserves high recognition for the brilliant organization and holding of the ICPC World Finals Astana. Their professionalism and well-coordinated work ensured a world-class event, strengthening the international authority of Kazakhstan in the IT sector. Deep gratitude is expressed for their contribution to the development of competitive programming and support of young talents.

Presented at the 2024 ICPC World Finals,  
September 2024, Astana Kazakhstan

The ICPC Foundation Outstanding International Contribution Award is presented to an individual or group that has played an instrumental role in the success of advancing the art and science of competitive programming through support of the International Collegiate Programming Contest.



The ICPC Foundation

# Outstanding International Contribution Award

Presented to



**FREEDOM  
HOLDING CORP.**

**Freedom Holding Corp.**

**Timur Turlov**  
CEO

Timur Turlov deserves special recognition for his generous support of ICPC, which has played an important role in the development of IT education and international cooperation. Thanks to his sponsorship, Kazakhstani students have received unique opportunities to participate in global competitions and develop their skills. His contribution to the formation of future leaders in the field of information technology deserves deep gratitude.

**Alina Dvoretckaya**  
Advisor to the President

**Baglana Mussina**  
President of the Corporate Fund

Freedom Holding Corp. deserves special recognition for their significant contribution to the success of ICPC in Kazakhstan. Thanks to their professionalism and support, the event was held at a high level, providing Kazakhstani students with unique opportunities to participate in the global competition. Deep gratitude is expressed for their dedication and contribution to the development of IT education in the country.

Presented at the 2024 ICPC World Finals,  
September 2024, Astana Kazakhstan

The ICPC Foundation Outstanding International Contribution Award is presented to an individual or group that has played an instrumental role in the success of advancing the art and science of competitive programming through support of the International Collegiate Programming Contest.

The ICPC Foundation

# Outstanding International Contribution Award

Presented to



## **Kassym-Jomart Tokayev** President of Kazakhstan

President Kassym-Jomart Tokayev deserves special recognition for his significant support for hosting the ICPC World Finals in Kazakhstan, which highlighted the importance of developing science and education in the country. His leadership and vision helped to position Kazakhstan in the global IT arena, strengthening international cooperation. Deep gratitude is expressed for his contribution to promoting Kazakhstan as a hub for IT innovation and opportunities for youth.

Presented at the 2024 ICPC World Finals,  
September 2024, Astana Kazakhstan

The ICPC Foundation Outstanding International Contribution Award is presented to an individual or group that has played an instrumental role in the success of advancing the art and science of competitive programming through support of the International Collegiate Programming Contest.

The ICPC Foundation

# Outstanding International Contribution Award

Presented to



## **Zhaslan Madiyev** Minister of Digital Development, Innovations and Aerospace Industry

Minister Zhaslan Madiyev deserves special recognition for his active support of the ICPC World Finals in Kazakhstan, which contributed to strengthening the educational and technological infrastructure of the country. His leadership and commitment helped to create conditions for the successful holding of the competition at the international level. Deep gratitude is expressed for his contribution to the development of the IT sector and support for young talents.

Presented at the 2024 ICPC World Finals,  
September 2024, Astana Kazakhstan

The ICPC Foundation Outstanding International Contribution Award is presented to an individual or group that has played an instrumental role in the success of advancing the art and science of competitive programming through support of the International Collegiate Programming Contest.

The ICPC Foundation

# Outstanding Community Engagement Award

Presented to



**Yerlan Bekmurzayev**  
State Inspector of the  
Presidential Administration  
of the Republic of Kazakhstan

Yerlan Bekmurzayev demonstrated outstanding professionalism and dedication in organizing and hosting the ICPC World Finals in Kazakhstan. Thanks to his efforts and organizational skills, Kazakhstan has become an important center for international cooperation and innovative solutions.

Presented at the 2024 ICPC World Finals,  
September 2024, Astana Kazakhstan

The ICPC Global Outstanding Community Engagement Award is presented to an individual or group that has played an instrumental role in the outreach of the International Collegiate Programming Contest.



The ICPC Foundation

# Outstanding Community Engagement Award

Presented to



## ICPC Contest Organizers of Kazakhstan

Fuad Hajiyev

Fuad Hajiyev, as one of the organizers of the first Kazakhstan Regional Contest, played a key role in the history of the development of the country's IT community. His dedication and professionalism became the basis for the successful holding of this significant event. His contribution to the promotion of information technology in Kazakhstan evokes sincere gratitude and recognition.

Presented at the 2024 ICPC World Finals, September 2024, Astana Kazakhstan

The ICPC Global Outstanding Community Engagement Award is presented to an individual or group that has played an instrumental role in the outreach of the International Collegiate Programming Contest.

The ICPC Foundation

# Outstanding Community Engagement Award

Presented to



## ICPC Contest Organizers of Kazakhstan

Darkhan Akhmed-Zaki  
Baydaulet Urmashiev  
Murat Orunkhanov  
Mikhail Mazhitov  
Zaza Gamezardashvili  
Elena Andreeva  
Vladimir Kotov  
Andrey Lopatin

Mansur Kutymbaev  
Askar Akshabayev  
Temirulan Mussayev  
Eskendir Sultanov  
Alimzhan Amanov  
Temirlan Satylkhanov  
Andrey Bogdanchikov  
Grigorii Shovkopyas

The organizers of the ICPC Regional Contests in Kazakhstan have demonstrated exceptional professionalism and dedication, ensuring a high level of events over many years. Their efforts have contributed to the development of information technology and support for young talents in the country. Sincere gratitude is expressed for their significant contribution to the scientific community.

Presented at the 2024 ICPC World Finals,  
September 2024, Astana Kazakhstan

The ICPC Global Outstanding Community Engagement Award is presented to an individual or group that has played an instrumental role in the outreach of the International Collegiate Programming Contest.

The ICPC Foundation

# Outstanding Community Engagement Award

Presented to



## ICPC Contest Organizers of Kazakhstan

Murat Orunkhanov  
Zaza Gamezardashvili  
Elena Andreeva  
Vladimir Kotov  
Andrey Lopatin

The regional leaders have demonstrated exceptional leadership and dedication, significantly advancing the development of ICPC at the international level. Thanks to their efforts, ICPC has become a powerful platform for identifying and supporting young programming talent. Their invaluable contribution to strengthening the global IT community is deeply appreciated.

Presented at the 2024 ICPC World Finals,  
September 2024, Astana Kazakhstan

The ICPC Global Outstanding Community Engagement Award is presented to an individual or group that has played an instrumental role in the outreach of the International Collegiate Programming Contest.



# Coaching Awards



# Lifetime Coaching Award

Presented to



**Xiaojun Wu**  
Tsinghua University

Presented at the 2024 ICPC World Finals,  
September 2024, Astana Kazakhstan

For excellence in coaching, having advanced teams to the  
ICPC World Finals for 20 or more years.

# Master Coaching Award

Presented to



**Hugo Humberto Morales Peña**  
Instituto Tecnológico de Costa  
Rica campus Alajuela

For excellence in coaching, having advanced teams to the ICPC World Finals for 10 or more years.



**Ho Dac Phuong**  
University of Engineering and  
Technology - VNU

For excellence in coaching, having advanced teams to the ICPC World Finals for 10 or more years.

Presented at the 2024 ICPC World Finals,  
September 2024, Astana Kazakhstan

# Master Coaching Award

Presented to



**Jelani Nelson**  
University of California, Berkeley

For excellence in coaching, having advanced teams to the ICPC World Finals for 10 or more years.



**Salvador Roura**  
Universitat Politècnica de Catalunya

For excellence in coaching, having advanced teams to the ICPC World Finals for 10 or more years.

Presented at the 2024 ICPC World Finals,  
September 2024, Astana Kazakhstan

# Master Coaching Award

Presented to



**Lech Duraj**  
Jagiellonian University in Krakow

For excellence in coaching, having advanced teams to the ICPC World Finals for 15 or more years.



**Slim Abdennadher**  
German University in Cairo

For excellence in coaching, having advanced teams to the ICPC World Finals for 15 or more years.

Presented at the 2024 ICPC World Finals,  
September 2024, Astana Kazakhstan



# Master Coaching Award

Presented to



**Vladimir Kotov**  
Belarusian State University

For excellence in coaching, having advanced teams to the ICPC World Finals for 10 or more years.

Presented at the 2024 ICPC World Finals,  
September 2024, Astana Kazakhstan

# ICPC World Finals Astana < Coaching Awards >



## Coaching Award

Presented to

**Dalie Sun**

Harbin Institute of Technology

For excellence in coaching, having advanced teams to the ICPC World Finals for 5 or more years.



## Coaching Award

Presented to

**Hua Huang**

Beijing Jiaotong University

For excellence in coaching, having advanced teams to the ICPC World Finals for 5 or more years.



## Coaching Award

Presented to

**Claudia Justel**  
Instituto Militar de Engenharia

For excellence in coaching, having advanced teams to the ICPC World Finals for 5 or more years.



## Coaching Award

Presented to

**Filipp Rukhovich**  
Moscow Institute of  
Physics and Technology

For excellence in coaching, having advanced teams to the ICPC World Finals for 5 or more years.



## Coaching Award

Presented to

**Temirlan Satylkhanov**  
Astana IT University

For excellence in coaching, having advanced teams to the ICPC World Finals for 5 or more years.



## Coaching Award

Presented to

**Valentin Zaytsev**  
Moscow Aviation Institute

For excellence in coaching, having advanced teams to the ICPC World Finals for 5 or more years.



## Coaching Award

Presented to

**Md Mahmudur Rahman**  
University of Dhaka

For excellence in coaching, having advanced teams to the ICPC World Finals for 5 or more years.



## Coaching Award

Presented to

**Subir Das**  
Indian Institute of  
Technology - Varanasi

For excellence in coaching, having advanced teams to the ICPC World Finals for 5 or more years.





## Coaching Award

Presented to

**Sukyoung Ryu**  
KAIST

For excellence in coaching, having advanced teams to the ICPC World Finals for 5 or more years.



## Coaching Award

Presented to

**Fábio Luiz Usberti**  
Universidade Estadual de Campinas

For excellence in coaching, having advanced teams to the ICPC World Finals for 5 or more years.



## Coaching Award

Presented to

**Michael Shindler**  
University of California Irvine

For excellence in coaching, having advanced teams to the ICPC World Finals for 5 or more years.



**Special  
Thanks**

# Host Acknowledgments

## HOST LEADERS

Adil Yessim  
Adina Magavina  
Alexei Bogatov  
Alina Dvoretzkaya  
Aliya Kaliazhdarova  
Anastasia Dunayeva  
Anna Dunaeva  
Artem Bassov  
Arthur Tantashev  
Aruzhan Kramshyeva  
Ashimbek Abilgazinov  
Bakhyt Matkarimov  
Danabek Kaliazhdarov  
Danial Shulembayev  
Diana Kislitsyna  
Kaisar Abdykassym  
Rayimbek Nagashybay  
Sulu Abdikerim  
Talgat Bakushev  
Tolkyn Nauryzbayeva

## HOST TEAM

Aleksandra Shevchenko  
Alisher Mustafin  
Anatoliy Nozarev  
Arlan Olzhabay  
Ayan Murat  
Aygerim Manap  
Azamat Imashev  
Daulet Berniyazov  
Dauren Orazbekov  
Dinara Baikadamova  
Dinara Tursunova  
Dmitry Brukhanov  
Edil Nurakhov  
Elizaveta Zagrevskaya  
Gaziz Shakirov  
Ilya Ushenin  
Inna Vagapova

Kseniya Gordienko  
Kuanysh Sadridenov  
Mukhit Samenov  
Natalia Khudaverdieva  
Nina Ivanova  
Polina Khomiakova  
Sergei Gorbachev  
Tatiana Bogatova  
Yelaman Kumisbek  
Yer-Ulan Nurlanov  
Yerzhan Amirkhanov  
Yevgeniy Kachan  
Zahar Nozarev  
Zhanibek Mashrapov

## HOST VOLUNTEERS

Abdumanap Yermakhan  
Abdurroshid Zhangabergen  
Abukhassym Khydyrbayev  
Abylkasym Kanat  
Abzal Bekezhan  
Adel Rakisheva  
Adilet Murzalin  
Aibar Kuanyshbay  
Aibar Absattarov  
Aibek Zainiddin  
Aida Amangeldina  
Aidana Abubakir  
Aidyn Shaikenov  
Aisha Toyekina  
Aishabibi Kuralbay  
Aiyazhan Issina  
Aizada Yergabyl  
Aizhan Kavidulla  
Aizhan Kundyzbek  
Akбота Assenova  
Akбота Kurmangazhyeva  
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Akezhan Askar  
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Ansar Yesmukhanov  
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Arman Zhalasbayev  
Arman Sydikov  
Artur Tsoy  
Aruzhan Tukeyeva  
Aruzhan Zhakhan  
Aruzhan Rakhmatullina  
Aruzhan Bishekenova  
Aruzhan Aidarkhanova  
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Ayaulym Sattarova  
Ayazhan Zholoman  
Ayazhan Orynbasar  
Azamat Zhenisov  
Azilkhan Bayuakov  
Aziza Yergeshova  
Bakhytnur Utegenova  
Bauyrzhan Zhonkebayev  
Beibarys Abishev  
Beibarys Myrzash  
Bekmyrza Abiltay  
Bekzhan Rakhimbayev  
Bogdan Shakaryan  
Damir Talipov  
Damir Sultanov  
Danial Shokobalinov  
Daniya Kudaibergenova  
Daniya Seitzhapparova  
Danial Abishev  
Danialar Khamza  
Darkhan Tleuzhan  
Darya Minyailo  
Darya Borodikhina  
Dastan Kermakhyn  
Diana Muratbekova  
Dilnaz Shaikhimova  
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Dilnaz Abilmazhinova  
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Dmitriy Son  
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Elina Sultanova  
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Galiya Kairbek  
Galymzhan Tashimov

Gaukhar Zhakimova  
Guldana Shukerbek  
Guldina Kabylzhanova  
Gulnaz Abzalova  
Gulnaz Rysbek  
Gulsum Akhmetova  
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Indira azimkhan  
Inkar Dos  
Jassan Baipakbayev  
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Kanagat Sharafiyev  
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Madi Gaziz  
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Madina Turgumbay  
Madina Mendibaeva  
Madiyar Askaruly  
Makhambet Turgali  
Maksat Myrzakhan  
Malika Zhumagali  
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Mariyam Almukhan  
Maxat Masgutov  
Maxim Ego  
Merey Kazbek  
Naziya Kospanova  
Nurai Bakhtiar  
Nurbak Ilesbek  
Nurdaulet Aldibek  
Nurlybek Taubakabyl

Nursultan Yerlanuly  
Parassat Kyzyrkanov  
Ramazan Zhakishiev  
Ramazan Zhalgasbay  
Rimma Kubanova  
Rustem Zhumabek  
Ruzana Turysbekova  
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Sagyn Jumadildayev  
Saida Burmaganova  
Sayat Abdikul  
Sofia Polyanskaya  
Sungat Serikbay  
Syrym Mukhametkazyev  
Tair Amitov  
Temirlan Zholtayev  
Temirlan Abulgazin  
Tolegen Aiteni  
Tomiris Abdrakhmanova



# 2024 ICPC World Finals Staff

Tomiris Kurmanalina  
Tomiris Kusanova  
Tomiris Zhanseit  
Torezhan Kabdyrakym  
Ulan Nurlanov  
Umida Kubenova  
Umit Khalelova  
Umit Kumarova  
Victoriya Tatarenko  
Vladislav Possin  
Yana Chizh  
Yasmin Aipanova  
Yelana Katranova  
Yelarys Yertaiuly  
Yelzhas Moldakhmetov  
Yerkezhan Tursynbekova  
Yerkezhan Armanova  
Yerzhan Yerbatty  
Yeskendir Baudarbekov  
Yesseniya Zhumagatova  
Yesset Zhandesh  
Zangar Manarbek  
Zarina Ashim  
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Zhanbolat Ilesbek  
Zhanel Turegeldiyeva  
Zhaniya Gaukharbek  
Zhansen Segizbay  
Zhassyn Yegnay  
Zhenis Kodirkulov  
Zhibek Adil

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Sulu Abdikerimova  
Melissa Elliott  
Tania Fitzpatrick  
Tolkyn Nauryzbayeva  
Lidia Perovskaya  
Veronika Soboleva

## **CLI SYMPOSIUM**

Joshua Andersson  
Erich Baker  
Matthew Ellis  
Nikolay Kalinin  
Riku Kawasaki  
Antti Laaksonen  
Christian Lim  
Fredrik Niemelä  
Suhyun Park  
Cristina Redondo García  
Miguel Revilla Rodríguez  
Emilio Revilla Rodríguez  
Vinit Shah  
Andrey Stankevich

## **ICPC CONTEST CONTROL SYSTEM & ANALYTICS**

John Buck  
Iakov Dlugach  
Jacob Eldering  
Michal Forisek  
Kevin Jilissen  
Oleksandr Kulkov  
Mikhail Mirzayanov  
Elena Murnina  
Mart Pluijmaekers

Samanway Sadhu  
Ulyana Sheremeta  
Michael Vasseur  
Tobias Werth  
Huaiyu Wu

## **ICPC EVENTS**

Melissa Elliott  
Tania Fitzpatrick  
Chelsea Kalyn  
Jacqueline Luscombe  
Christina Millar

## **ICPC GRAPHICS**

Tim deBoer  
Keith Johnson

## **ICPC LIVE**

Maxim Alzhanov  
Konstantin Bats  
Roman Elizarov  
David Harmeyer  
Andrew He  
Azat Ismagilov  
Mikhail Kornilovich  
Egor Kulikov  
Pavel Kunyavskiy  
Lidia Perovskaya  
Victoria Volochay  
Mariia Zhogova

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Rob Brown  
Hans Domjan  
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