Overview of 2020 CAD Contest at ICCAD

Invited Talk

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ABSTRACT

The "CAD Contest at ICCAD" is a challenging, multi-month, research and development competition, focusing on advanced, real-world problems in the field of electronic design automation (EDA). Since 2012, the contest has been publishing many sophisticated circuit design problems, from system-level design to physical design, together with industrial benchmarks and solution evaluators. Contestants can participate in one or more problems provided by EDA/IC industry. The winners will be awarded at an ICCAD special session dedicated to this contest. Every year, the contest attracts more than a hundred teams, fosters productive industry-academia collaborations, and leads to hundreds of publications in top-tier conferences and journals. The 2020 CAD Contest hits a record high of 186 teams from all over the world, which represents more than 50% growth compared to last year. The contest keeps enhancing impact and boosting EDA research.

KEYWORDS

CAD Contest, electronic design automation, computer-aided design, integrated circuits

1 INTRODUCTION

With continuous technology advancement and stringent specification requirements of modern electronic systems, the IC design complexity has grown dramatically during the past decades. Electronic design automation (EDA), or computer-aided design (CAD), plays an extremely important role to tackle various design challenges, reduce design cycles, and achieve the best trade-off among performance, power, reliability, and cost. In order to boost EDA research, the *CAD Contest at ICCAD* [1] offers a platform for industrial companies to share various design problems and design cases

while it encourages researchers in academia to study state-of-the-art IC design challenges and advance problem solving techniques. The contest is a multi-month, research and development international competition, focusing on advanced, real-world problems in the industry.

The CAD Contest was originated as a domestic contest in Taiwan in 1999. It had been a successful annual competition activity, sponsored by Ministry of Education (MOE), Taiwan, for cultivating talented young professionals in the EDA field while contributing to the semiconductor industry. Since 2012, the CAD Contest has been presented at IEEE/ACM International Conference on Computer-Aided Design (ICCAD) [2–9], under joint sponsorships of ACM SIGDA [10], IEEE CEDA [11], MOE of Taiwan, and other industrial companies, including Cadence Design Systems, Inc. [12] and Synopsys, Inc. [13], while the contest environment, including both hardware and software, is supported by Taiwan Semiconductor Research Institute (TSRI). The contest has already been publishing many sophisticated circuit design problems [14–37], from system-level design to physical design, together with industrial benchmarks and evaluators.

Contestants from all over the world can participate in one or more problems provided by the industry. The winners will be awarded at an ICCAD special session dedicated to this contest. Every year, the contest attracts more than a hundred teams, fostering productive industry-academia collaborations, and leading to hundreds of publications in top-tier conferences and journals. The contest keeps enhancing its impact and boosting EDA research.

2 CONTEST PROBLEMS

The ICCAD-2020 CAD contest features the following three critical problems provided by Cadence Design Systems, Inc., Synopsys, Inc., and Nvidia Corp., respectively.

- **Problem A "X-value Equivalence Checking"** [35];
- **Problem B "Routing with Cell Movement"** [36];
- **Problem C "GPU Accelerated Logic Re-simulation"** [37].

3 CONTEST SCHEDULE

The contest starts in February and ends in November. The detailed schedule is shown in Fig. 1.
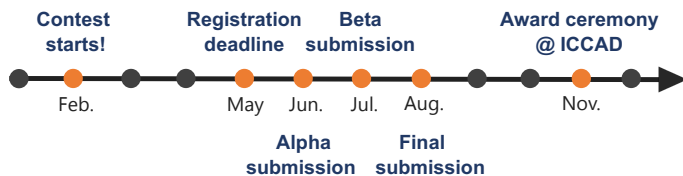
Figure 1: The contest schedule.

4 REGISTRATION STATISTICS

The contest receives 186 registered teams from 16 countries/regions, including Bangladesh, Brazil, Canada, Egypt, Hong Kong, India, Japan, Korea, Mainland China, Nepal, Russia, Spain, Taiwan, United Kingdom (UK), United States of America (USA), and Vietnam. Fig. 2 shows the numbers of registered teams and countries/regions where the contestants resides in from 2012 to 2020.
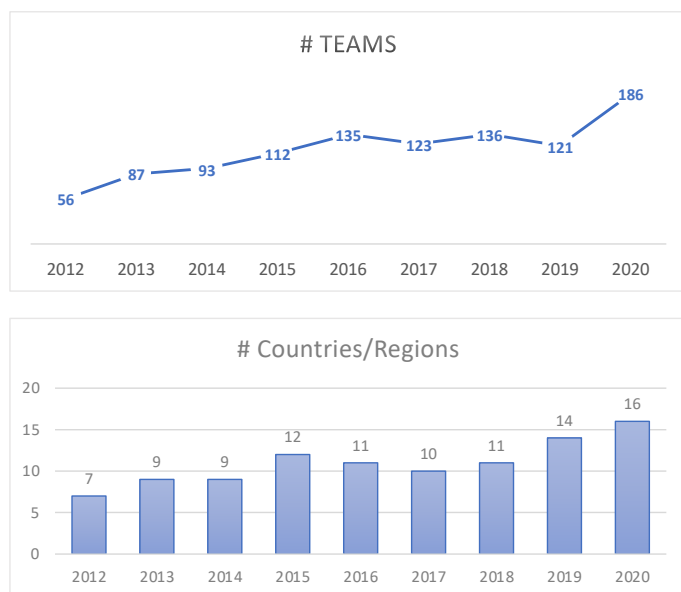

Figure 2: The numbers of registered teams and countries/regions where the contestants reside in from 2012 to 2020.

5 AWARD CEREMONY

The award ceremony is held at an ICCAD-2020 special session. The session will give an overview of the 2020 CAD Contest, introduce the three contest problems to the community, announce the contest results, and present the awards to the winners. The video clips made by contestants, which introduce key ideas and algorithms to the contest problems, will also be played and demonstrated. The Design Automation Technical Committee (DATC) of IEEE CEDA will finally present a reference design flow.

6 CONCLUSIONS

The CAD contests at ICCAD have presented critical problems and industrial benchmarks to the academic community resulting in research breakthroughs and industry-academia collaborations since 2012. The contest has become one of the largest world-wide academic competitions, and attracted over 800 international teams during 2012–2020. The published industrial benchmarks have been widely adopted by academia, resulting in numerous publications. The contest keeps enhancing its impact and boosting EDA research.

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