IEEE CASS/CEDA Seasonal School on Electronic Design Automation (EDAS2020)

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Abstract—The first IEEE CASS/CEDA Seasonal School on Electronic Design Automation (EDAS2020) has offered twenty-one talks on key topics on electronic design automation for integrated circuits in modern and upcoming technologies, including current and future challenges faced by the industry and academia for implementing complex circuits and systems. This first edition counted 215 participants, 11 posters, 22 engaged speakers, an interesting Hands-on Tutorial using Open Source EDA tools, and three panels. The event was held on a virtual platform, between December 7-11, 2020.

I. INTRODUCTION

The EDAS2020 was an event dedicated to students and professionals in Brazil and South America to promote discussions on hot topics and cover fundamental algorithms, computational methods, and machine learning techniques in the area, so that the attendees could leverage their comprehension and capabilities while attracting new students and researchers to the relevant problems.

EDAS2020 was sponsored by IEEE Circuits and Systems Society (CASS), in the frame of the CASS Seasonal Schools Program. EDAS was also sponsored by the IEEE Council on Electronic Design Automation (CEDA) and by Cadence, Synopsys and Chipus. Its organization was supported by the Brazilian Microelectronics Society (SBMicro), the Brazilian Computer Society (SBC), Universidade Federal de Santa Catarina (UFSC), Universidade Federal do Rio Grande do Sul (UFRGS) and the Tutorial Program in Computer Science from UFSC (PET Computação). The staff was composed of fifteen volunteers (students) who helped in the social media advertisement, in the Zoom platform management, in session recording, in the interaction with the participants and in various other activities.

The main goals of this CASS/CEDA seasonal school were:

- To bring together the local community, fostering local interactions and stimulating cooperation among students, researchers, and professionals in the region;
- To bring the local community closer to leading researchers and professionals in their field of knowledge;
- To stimulate students to learn, research, and eventually follow a career in the field of EDA

The success of this event can be assessed by considering the following factors: 1) Number of participants: The event had 215 participants from several locations. 2) Quality of the presentations: According to the feedback received from the participants, the presentations and the tutorial were considered very motivational, with excellent technical content and also bringing an overview on trend topics. 3) Networking between participants in a virtual environment, a big challenge. The panels and poster sessions proved to be a good alternative to effectively integrate the participants and stimulate the networking. 4) Number of new IEEE CASS memberships after the workshop: it was observed a dozen of new IEEE CASS memberships motivated by EDAS.

To fulfill these objectives, an IEEE CASS and CEDA talk was included in the program, providing information to the general public on how to subscribe to IEEE and to CAS society, and explaining the membership benefits. Therefore, we will submit a proposition for a book based on the lectures' slides with added explanatory text for each slide.

All the speakers agree voluntarily to prepare and given the live sessions of the mini courses, dedicating their preciously time on the elaboration and conduction of the courses. With this program, we also achieve an surprising result: reconnecting us with former students trained in Brazilian institutions that are currently working in companies in the EDA area around the world. EDAS2020 program, including all the posters and videos submission, as well the best posters chosen by the EDAS judging committee, and more details are available at the official EDAS website: https://ecl.ufsc.br/edas/index.php/edas/ and on facebook page: https://www.facebook.com/edas.ufsc/. The characteristics of the virtual event limit the photos with participants, but a sample of the events held can be expressed in the Fig. 1.

EDAS 2020 program comprised 21 courses that covered the VLSI design flow in 30 hours, from the basic steps to the optimization techniques, as well as challenges for the advanced and future technology nodes. All the speakers agreed to voluntarily prepare and give the live sessions of the courses (with an average duration of 1h30min each), dedicating their precious time to prepare and conduct the courses. The program started with an introductory course to provide an overview of the EDA area given by Ricardo Reis and José Luis Güntzel. After that, an Introduction to the Modern Design Flow was conducted by Mateus Fogaça (Cadence). The second part of the first day was dedicated to Logic Synthesis topics, with the basic concepts presented by Augusto Neutzling Silva (Cadence) and Jody Matos (Silvaco), and two courses about the Challenges on Logic Synthesis given by Vinícius Callegaro (Mentor) and
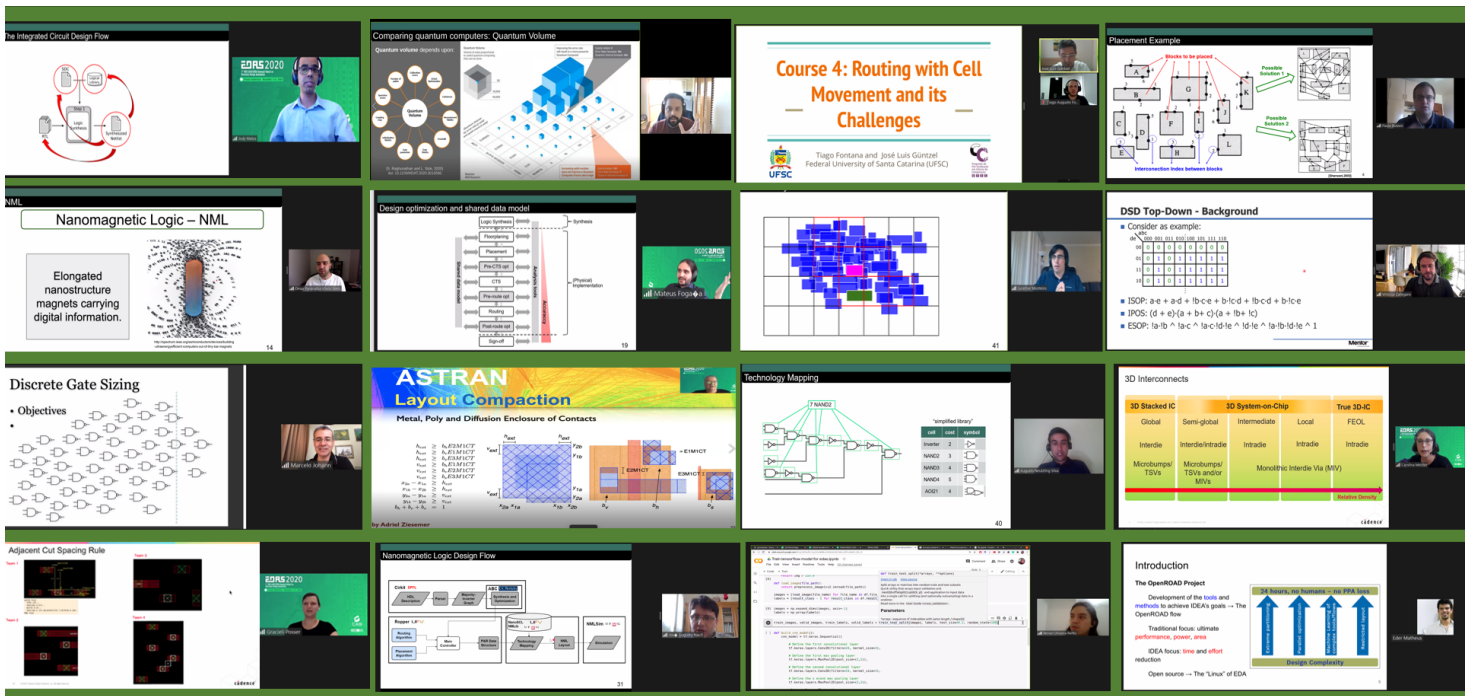
Fig. 1. A sample overview on EDAS2020.

Vinícius Possani (Synopsys). The second day main topic was the Placement step, with the Global Placement course given by Paulo Butzen (UFRGS), the Placement Legalization course by Jucemar Monteiro (Synopsys), the Detailed Placement course by Sheiny Fabre Almeida and Cristina Meinhardt (UFSC), and finalizing with the considerations about Physically-aware synthesis conducted by Guilherme Flach (Synopsys). The third day started with a course on Automatic Cell Generation by Ricardo Reis (UFRGS), followed by 3 courses dedicated to routing. The first one, given by Renato Hentschke (Synopsys), was dedicated to Global Routing, the second one, by Gracieli Posser (Cadence), was devoted to Detailed Routing, and the last one, given by Tiago Fontana (UFSC) and José Luis Güntzel (UFSC), on Routing with Cell Movement. In the fourth day, the following talks took place: Timing Optimization, by Vinicius Livramento (Flow Traders), Gate Sizing, by Marcelo Johann (UFRGS), Visualization Tools, by Ricardo Reis (UFRGS) and Clock Synthesis, by Gustavo Wilke (Synopsys). In the last day, December 11, the following talks were presented: Synthesis of Quantum Circuits, by Calebe Conceição (IFSul), Synthesis of NML Circuits by Omar Paranaiba Vilela Neto (UFMG) and José Augusto Nacif (UFV), Synthesis of 3D Circuits, by Carolina Metzler and Ricardo Reis (UFRGS) and the last one on Machine Learning application on EDA, by Renan Oliveira Netto (UFSC).

The program also included a 4-hour hands-on tutorial using the tools from the OpenRoad Project, 3 poster sessions and 3 panels, and a talk about the benefits of IEEE/CASS-CEDA membership by José Rodrigo Azambuja (UFRGS/CASS) and José Luís Güntzel (UFSC/CEDA). The panels focused on topics that could motivate the participants, mostly undergraduate and graduate students, to target their future careers to the EDA area. Therefore, the first panel, chaired by Cristina Meinhardt (UFSC) e Leomar S. Rosa Jr. (UFPel), counted with the participation of young researchers who reported their trajectories in EDA companies abroad. In the second panel, chaired by Gracieli Posser (Cadence) and Cristina Meinhardt (UFSC), the various Brazilian students who have participated in EDA contests reported how those experiences have leveraged their research and increased their skills in the area. Finally, in the third panel, chaired by Daniel Barcelos (CEITEC), professionals from IC Design and EDA companies talked about challenges and opportunities in next generation EDA tools, including career perspectives. The participants of this panel were Marcelo Silva (Cadence), Victor Grimblatt (Synopsys), Murilo Pessatti (Chipus), and Bernardo Culau (Silvaco).

Due to the success of the first edition, the participants asked for a second edition of EDAS in the future. We would like to thank to Universidade Federal de Santa Catarina, for providing the infrastructure, to IEEE CASS, for the financial support, and to IEEE CEDA, for providing the Zoom platform, as well to the industrial sponsors Cadence, Synopsys and Chipus.