

20 Years of the Central European Seminar on Computer Graphics

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Abstract

The Central European Seminar on Computer Graphics is an annual scientific seminar for undergraduate students of computer graphics, vision and visual computing. Its main mission is to promote graphics research and to motivate students to pursue academic careers. An international committee of experts guides their research work for several months. At the end, students present their results at a three days seminar to an audience of approx. 100 students and professors. All attendants actively participate in discussions and workshops focused on academic skills and career planning for young researchers. Interactive sessions on innovation help them to identify the value of their ideas and motivate them to continue in their work.

Categories and Subject Descriptors (according to ACM CCS): I.3.m [Computer Graphics]: Miscellaneous—Promotion of undergraduate research

1. Introduction

The Central European Seminar on Computer Graphics (CESCG) is a special cooperation of about 25 computer graphics and vision groups in about one dozen European countries. Through CESCG, talented undergraduates are taught scientific practices and thereby motivated to become researchers in the field of computer graphics.

The main idea of the CESCG is to bring undergraduate students who are interested in computer graphics together across the borders of European universities and countries. The seminar is an international annual event where students present their high-quality work and acquire important soft skills. It is a unique combination of a scientific conference with an intense mind training.

Undergraduate students establish a first direct contact with a scientific conference. During paper preparation, students learn how to write about their work, how to embed it within the state of the art and how to present their results. To get feedback to the submitted paper, an informal but international reviewing procedure is part of the seminar organization. The comments of the reviewers (well-established scientists) help students to improve their written work before it is published in the seminar proceedings. Students should give a “test talk” at their university before the seminar to practice their presentation. The organizers also offer reviews for the slides short before the seminar.

The event opens with a dynamic fast-forward session. Similar to a regular research conference, the best papers and presentations are awarded. Students are also encouraged to include videos in their submissions to promote their work. This motivates students to prepare the material for the seminar in the best possible way. While other seminars and conferences can be considered passive, at the CESCG all attendants actively participate in workshops. This helps undergraduate students from about twenty universities to improve presentation skills for scientific work in both written and oral form. Over the years, the quality of submitted papers constantly improves, which seems to have a clear causal relation to the educational aspect of CESCG. The better the CESCG standard of papers gets, the more students try to contribute best-possible papers and presentations.

Teachers from the partner institutions carefully select and send their most promising talents to CESCG to motivate them for future research projects, e.g., a PhD project. So CESCG has become an enabling factor for high-quality research in Central Europe. Twenty successful years of CESCG prove that this very well accepted seminar in fact strongly encourages students to consider an academic career. We can report that a large number of the CESCG students are now researchers and do internationally appreciated scientific work. The following sections not only document various aspects of the seminar. They are also an invitation to join



Figure 1: Photo of the participants in Smolenice, 2013.

the CESCg and hopefully an inspiration to establish similar events in other geographic locations.

2. History

Since November 1990, bilateral Joint Seminars had been organized by the graphics departments of the Comenius University (UK) in Bratislava and the Vienna University of Technology (TU). Growing interest in these Joint Seminars documented the potential for a larger and more wide-spread setup [HFSK00]. In 1996, Helwig Hauser (at this time with TU Wien) had the idea to come up with an international conference-like event for undergraduate students, dedicated to Central European research groups in the field of computer graphics and vision. In 1997, the first CESCg was organized by Helwig Hauser in Vienna and Andrej Ferko in Bratislava with student contributions from Budapest, Prague, Brno, and Graz. From 1998 until 2010, the beautiful castle of Budmerice, Slovakia, was the gorgeous venue of the seminar [WFSKH06]. The unique classic atmosphere of the venue remains in the hearts and memories of many participants.

The Budmerice castle was repeatedly forced to close down. In 2006 the 10th anniversary celebration was held in Častá and in 2011 a mill in Viničné was a last-minute substitute. Fortunately, the organizers managed to find a very good long-term substitute – the Smolenice castle just 20 km away from Budmerice (see Figures 1 and 2). Governed by the Slovak Academy of Sciences it offers better infrastructure and higher capacity. All participants are accommodated directly in the castle. Build at the foot of the Carpathian mountains it is enclosed by beautiful nature but still at the periphery of a small town. The 20th edition of CESCg in 2016 will be the fifth seminar held in Smolenice. In the recent decade the seminar was organized by Michael Wimmer and Martin Ilčík from the Austrian side and by Andrej Ferko, Ela Šikudová, Matej Novotný, Ján Lacko, Jana Dadová and David Běhal from the Slovakian side.

3. Spirit of the CESCg

As no other conference, CESCg has developed a unique spirit over the years which as a meme [Daw89] is passed

to the future generations of participants. It is a mixture of a historic venue with the cutting-edge innovation in the visually most appealing field of computer science, combined with strong personalities of the organizers who invest a lot of time and love to its preparation which makes the atmosphere so unique. Michael Wimmer opens the seminar with running jokes about the CESCg history, Martin Ilčík organizes a detailed historic castle tour and Andrej Ferko introduces the seminar structure at the welcome dinner in an unforgettable way: *"In his seminal book the Act of Creation [Koe64] Arthur Koestler explains that we are creative when we bisociate. After the bisociation, we broadcast AH, AHA or HAHA. When unsure, we say HM... These Art, Science or Humor sparkling events give the spirit of CESCg. CESCg just maximizes the number of AHAs during the scientific program and the other ones in the social program."*

4. Organization during the year

In twenty years the organizers achieved a high level of optimization during both the preparation and the execution phase. Since the venue is the same every year and the team does not change very much there is a high amount of routine. Nevertheless, unexpected will always happen and planning with a time reserve is necessary.

Each year around February the partner universities nominate their top students for the seminar. While finishing their research work, students are guided through the academic publishing process. In this first phase, they are trained in scientific writing. All submitted drafts are reviewed and eval-



Figure 2: The venue of CESCg, Smolenice castle. M. Švec.

uated by three independent experts, providing valuable feedback to the students. Together with their supervisors they improve the drafts based on the received comments and send the camera-ready versions at beginning of April. The best 24 papers get a full presentation slot at the seminar, the rest is selected for a short presentation in the poster session. All submissions are printed in full-length in the proceedings regardless of the assigned presentation type. Compared to common scientific conferences CESC program committee members are instructed to be very patient when reading the papers and very constructive when writing the reviews. It is the first time the students have written a paper and also the first time they will receive feedback. Strict or reserved comments would certainly not motivate them to academic careers.

In the second phase, the students learn how to give an interesting talk about their research results. An international team is ready to give remote feedback on the presentation in the last week before the seminar. Students should also give a test talk at their alma mater to practice in front of a real audience. It is also a matter of prestige to prepare an interesting 30 seconds fast-forward. Very often the students are comfortable doing the standard 20 minutes presentations but the a reduction to 30 seconds is a challenge. They agree that preparing the fast-forward is a fully new, very valuable experience for them.

In the background of the student research work the organizers are concerned with editing and printing the proceedings, managing accommodation and board in the castle, preparing the social program and most important of all gathering funding.

5. CESC and its schedule

The seminar takes place on three consecutive days in the Smolenice castle, Slovakia. Its schedule combines a scientific conference with an intense training of academic skills. The program is divided into morning and afternoon sessions including time for free discussions during coffee breaks. Figure 3 shows the general structure that get slightly adapted for each year.

There are 24 presentations of student papers, 20 minutes each with 5 minutes for discussion. A poster session accommodates all remaining submissions. Videos showing the student work and results are screened in the hallways of the castle during the whole event. Besides student presentations, each year there are 2 invited talks by prestigious computer graphics researchers.

Not only the presenting students are actively involved. Workshops with skilled mentors are supposed to stimulate the involvement of all attendants to their maximum.

5.1. Presenting workshop

The first active workshop session is held in the morning of the first day before the official opening of the seminar. In a

	BREAKFAST	BREAKFAST
REGISTRATION	SESSION	SESSION
	COFFEE BREAK	COFFEE BREAK
WORKSHOP	SESSION	WORKSHOP
LUNCH	LUNCH	AWARDS CLOSING
OPENING FAST-FORWARDS	INVITED TALK	LUNCH
INVITED TALK	SESSION	
COFFEE BREAK	COFFEE BREAK	
SESSION	SESSION	
POSTERS		
CASTLE TOUR	WORKSHOP	
DINNER		
WORKSHOP	DINNER	

Figure 3: A generalized scheme of the CESC program.

short introduction on *How to give a great talk* the students learn the basics including the general talk structure, interaction with the audience, maintenance of attention and focus, etc. The theory is applicable to both, short and standard length-talks, but the workshop duration allows to practice only for short pitches.

Right after the introduction, the presenting students do a cold-run for their fast-forwards. Since everything has to run smooth at the opening ceremony it is very important to rehearse before. After each fast-forward the audience is not asked (many people are shy) but urged by the host to provide feedback following the principles and structure explained in the talk earlier. The learning effect works for both the audience and for the presenters who still have one or two hours to fine-tune their pitch. The difference between the confounded rehearsals and the actual fast-forwards is remarkable.

Conclusion to the first part of the active program is a pitching game on the first evening. It is an ideal ice-breaker after the welcome dinner. Participants perform a 3 minutes pitch to a topic defined by two random CG-related words collected from the audience. The audience assesses whether the pitch followed the outline defined in the morning workshop. Students perceive the workshop as game, but in fact they practice their improvisation and confidence. A failure in a controlled game environment has no consequences for them (except for the learning effect). Moreover, the setting within the context of computer graphics is familiar and well understood for them.

5.2. Storytelling workshop

The second workshop is held in the afternoon of the second seminar day. Its topic is storytelling in scientific publications. The workshop mainly oriented on participants who did not submit a paper, but presenting students often enjoy as well. A general story line following the principles of a monomyth [Cam49] is briefly explained in the beginning. Participants then assign keywords from their ongoing projects (Bachelor's or Master's) to the steps of the story line. Mentors go around the room, talk to the students and help them with the assignment. At the end of the workshop randomly selected students present their stories.

The storytelling workshop requires a lot of focus and durable attention from the students. Again, the familiar context of an own visual computing project stimulates analytic thinking and makes the practice easier. Students can directly use the assembled story lines later when writing a report or a thesis.

5.3. Graduate studies workshop

The last day starts more relaxed. Professors gather to a panel discussion with the students about graduate programs in visual computing at different universities in different European countries. In the background of the curricula comparison students are also introduced to various styles of the academic life and motivated to apply.

Before the concept of workshops, an informal fair of graduate positions has always been present. Over the years, CESCg was very successful in mediation of Master's and PhD supervisors and topics. It is primarily the social aspect of a casual relationship that emerges during the social program. If the personalities of a student and a professor match, it is likely that they will start talking about a project topic. Success rate of such academic partnerships is higher compared to a blind search for a topic.

5.4. Feedback

Along with the voting for the best presentation award feedback is collected from the participants. Most of the comments are positive. The leading keyword is *workshops*. Students really enjoy them. On the second place there is the social program and activities like the guided castle tour or a hike to a bronze age settlement in the woods not far away. The most frequent improvement proposal is to serve more beer in the evening.

6. Funding a student seminar

Rental of the premises, accommodation and board are the only expenses for the organizers. Rental of the Budmerice castle was really cheap, thus until 2010 there were almost no fees. Students presenting papers and their supervisors stayed in the castle for free including full board! Passive participants paid €40.

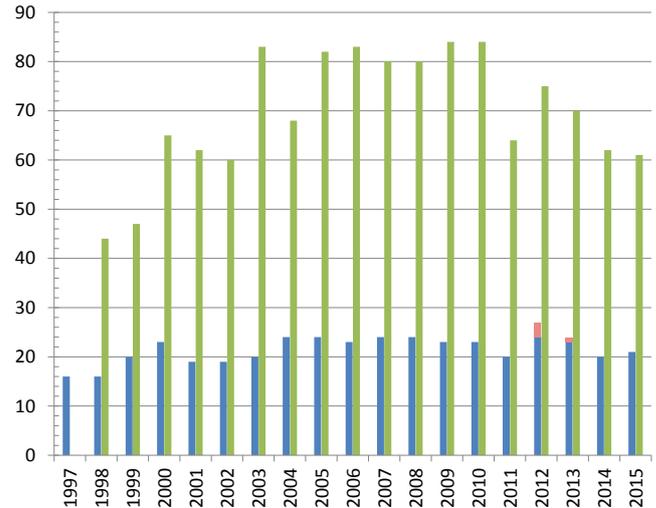


Figure 4: Attendance statistics of CESCg. Participants count (green) is missing for 1997. The number of presented papers (blue) is stable. As it peaked around 2012 there were also poster presentations (red).

Nowadays the situation is different. One person with full board costs €50 per day, i.e. €150 for the whole seminar. Universities could cover such expenses for their employees, but not for students. Young people themselves are not able to pay the full price. During the recent years the student fees (all included) were around €70. As the price is slowly rising in the number of participants is quite visible in Figure 4. The current price being too much for the participants and the long term effort is to seek funding options to push the fees lower.

Sustainability of the seminar depends on external funding and donations. The first option are local funding agencies. The Austrian Computer Society and the Slovak Information Society future oriented reliable partners supporting a few students each year. In 2004 CESCg was accepted for the UNESCO Cultural Heritage support program. First a decade later it obtained strong support from the International Visegrad Fund in 2015. The general success rate is very low. Funding multilateral projects from standard granting schemes is especially difficult. The second option are larger companies active in computer graphics applications and research. In the world of industry personal contacts and recommendations are very important. Establishing contacts with new partners is very difficult. Therefore, the list of sponsors is relatively stable, yet too small to drop the fees reasonably low. Prospective companies like VRVis, Autodesk, Disney Research, or NVidia and visionaries like Alan Chalmers, Markus Gross, Helmut Pottman, and Werner Purgathofer are the angels who do not fear to invest into talented young people – the future stars of visual computing.

7. Dissemination of CESC G

Different points of view imply different metrics for dissemination of the long-term seminar results. The scientists prefer to judge by the quality of papers published. Industrial partners mostly look at the impact on their public relations or at the success rate of recruiting young specialists.

7.1. Scientific output

CESC G authors receive a large amount of feedback in various forms (none of them double-blind), but there is formally no rejection possible. Responsibility for the submission quality is carried mainly by their supervisors who are respectable scientists. The seminar is thus classified as non-peer-reviewed and the work can be re-submitted to most peer-reviewed journals and conferences. The level of student papers has grown to a very high level during the recent years. The main reason is an excellent, but also time-consuming guidance of their local supervisors. Unfortunately, if the supervisors invest too much effort into the supervision and their joint work with the student reaches a certain quality threshold they often skip the CESC G and submit the results directly to a peer-reviewed journal or conference. Scientific benefits of higher-level publications are clear, but being not mutually exclusive, we believe that a prior CESC G experience is very important for students from the educational point of view.

Given that CESC G is a non-peer-reviewed undergraduate seminar its scientific impact is considerable strong. Figure 5 provides an overview of citations for all CESC G publications as captured in March 2016 by the Google Scholar. The darker the area the more papers published in the respective year were cited at least once. Height of the graph represents the sum of the citations for the respective year. Around 2004 there were a few very positive outliers with over 50 citations per paper. The most cited one [K03] achieved 227 citations since 2003. In the same period the ratio of papers cited at least once also reached its maximum (shown in Figure 6). An average undergraduate can hardly compete with experienced scientists. Since 1997 there are 411 CESC G papers, but only 55% of them got cited at least once. The average number of citations per paper is 2,89.

Interpretation of the falling trend of citations in the recent three years is not certain yet. The program committee did not observe a quality drop of the submissions. It is likely that the most recent papers will receive more citations in the following years.

Convergence of the main seminar goal – promotion of academic and research careers – is more difficult to quantize. We investigated scientific records of all 484 authors of all 411 CESC G papers using various search engines. The number of undergraduates who decided to continue with a graduate study turned out to be rather high. In particular around 2009 the conversion rate was around 60% (Figure 7). Since not all of the authors are in the last year of their study when

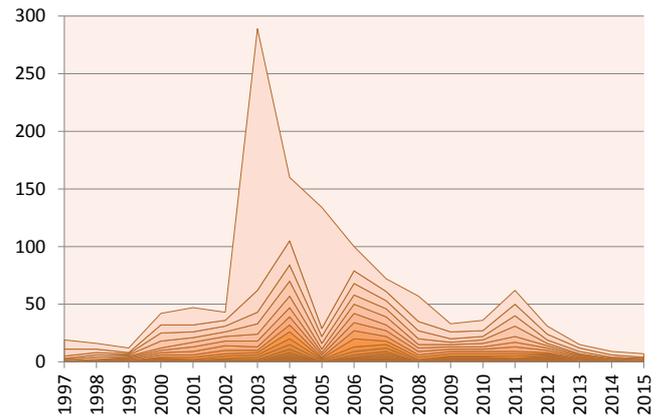


Figure 5: The amount of citations for CESC G papers accumulated by the year of publication, state in March 2016.

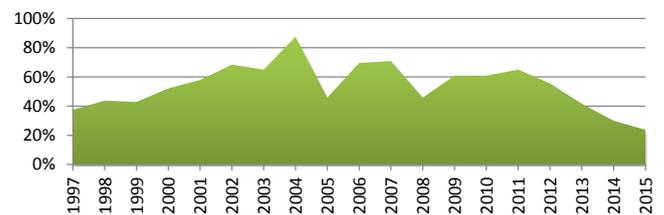


Figure 6: The ratio of papers cited at least once. Ordered by the year of publication, state in March 2016.

presenting at the CESC G, data for the recent years are incomplete yet. E.g., the number of PhD candidates from 2015 is expected to reach the average level in two or three years.

The seminar directly participates in the continuous growth in size and quality of computer graphics, vision and visualization groups in Central Europe. Since 1997 it provided motivation, knowledge, experience and networking to 222 students who later became researchers. Some of the participants from the early years are now professors sending their students to the CESC G to form the next generation of visual computing researchers.

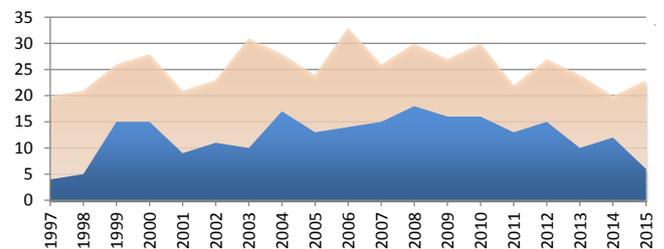


Figure 7: The count of authors who pursued a graduate study after the CESC G (blue) compared to the total number of authors for the respective year (orange).

7.2. General visibility

Visibility of the event toward the general public is becoming more and more important to satisfy the requirements of both the funding agencies and sponsors. The organizers are scientists and teachers, not very knowledgeable in marketing and public relations. But they try their best.

All published materials and information for students is available at the seminar webpage (<http://www.cescg.org>). It seems that establishing a Youtube channel (<http://bit.ly/1MZ85em>) with a showcase of student work and reports from the event was the best choice so far. Within 9 months of its existence it achieved 2100 views with an average view duration of 1 minute. The most popular video with 420 views shows an efficient implementation of bi-directional path tracing on the GPU [OV15].

A Facebook page started a few years ago as a trivial approach to connect the participants after they attend seminar, however it has not achieved much success. A proper community management is one of the important tasks for the future.

8. Continuation and Future

Organization of the seminar is a long-term task. Its results can be disseminated only slowly. Therefore, we prefer not to draw conclusions but rather look forward what the future brings. In the twenty years the format of CESC G has developed to a successful and respected event for undergraduate students. Maintenance of quality and financial stability will continue to be the most important tasks for the future organizers. Further improvements in the concept will be for sure necessary to reflect the evolution of society and technological advances. There is still a lot of potential for the seminar to grow and we hope it will.

Acknowledgments

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