ECER 2018 PROCEEDINGS AND REPORT [DELIVERABLE 3.3]

ER4STEM - EDUCATIONAL ROBOTICS FOR STEM

The ER4STEM project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No. 665972

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DOCUMENT REVISION HISTORY

Version Number	Date	Description	Author
V1	05.06.2018	First version	Wilfried LEPUSCHITZ
V1.1	06.06.2018	Update	Clemens KOZA
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V2	11.06.2018	Final version	Wilfried LEPUSCHITZ

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1 EXECUTIVE SUMMARY

1.1 ROLE/PURPOSE/OBJECTIVE OF THE DELIVERABLE

This document presents the preparations, description and proceedings of the European Conference on Educational Robotics (ECER) 2018, which took place between the 16th to 20th April in Qawra, Malta.

1.2 RELATIONSHIP TO OTHER ER4STEM DELIVERABLES

This document is connected with D3.4, which will contain the final conference plan as outcome of the project ER4STEM.

1.3 STRUCTURE OF THE DOCUMENT

Section 2 describes the preparations for ECER 2018. Section 3 reports on the schedule and lists the participating teams. The results as well as talk topics of ECER 2018 are presented in Section 4. The remaining sections give a summary and conclusion and provide a glossary as well as references. The Call for Papers for ECER 2018 is attached in Section 9. Furthermore, the printed conference proceedings are attached in Section 10.

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2 PREPARATION FOR ECER 2018

The preparation phase was split into two phases: Phase 1 from September to December 2017 and Phase 2 from January to April 2018.

Performed tasks in Phase 1:

- **Setup of ECER Website**: A website was set up within the PRIA website informing about the conference. It also included a form allowing the registration of participants. Later, the Call for Papers was added and a link to a paper submission tool (Open conference tool) was provided.
- **Finding sponsors**: As ECER itself was covered by ER4STEM, the intention was to find sponsors that would support material costs of participating teams. Each participating country and the teams searched for sponsors on their own.
- **Organisation of venue:** The AcrossLimits (AL) team researched for an appropriate venue in Malta. The teams of AL and PRIA decided that the most appropriate place is the Seashells by Suncrest Resort in Qawra. The Seashells provided one large hall and three smaller rooms, as well as open spaces. The large hall was used for working spaces and talks by students and researchers, the open spaces for the publicly visible tournaments, and the rooms were used for interviews and staff.
- **Advertise participation**: E-Mails were sent out to participants of previous issues of ECER. Also ER4STEM partners contacted their school partners to advertise for participation.
- **Link to WP2**: First planning of Botball workshop.

Performed tasks of Phase 2:

- **Participation at Botball Instructors' Summit at the KISS Institute of Practical Robotics (KIPR), Oklahoma, USA:** Markus Klein of PRIA participated at the Botball Instructors' Summit to obtain information about the season's rules as well as about the current Botball set. Furthermore, details regarding the registration process and shipment of robotic sets to the participants were clarified.
- **Delivery of Botball sets**: PRIA arranged the delivery of Botball sets for all Botball teams and arranged the delivery of sets to abroad teams. Botball sets are required if a team wants to participate in the official Botball tournament. Each set comprises two robotics controllers, an iRobot by Create, as well as metal and Lego parts.
- **Contact with participants:** PRIA, AL and other country organisers were in regular contact with the participants of ECER for supporting in various matters ranging from the writing of papers to technical issues with the robotics sets.
- **Link to WP2**: One Botball workshop at PRIA was prepared and carried out. Information from the Botball Instructors' Summit was passed on to the Austrian teams. The Bulgarian teams as well as the Maltese teams did not inquire for a Botball workshop, as they had already participated in previous years, or participated in a different tournament.
- **Planning of tournaments**: Four tournaments were envisaged for ECER 2018:
    - Botball tournament: Botball is an educational robotics program that focuses on engaging middle and high school aged students in team-oriented robotics competitions. The Botball program has been active since 1998 and features a robotics curriculum which focuses on designing, building and programming a pair of autonomous robots. Teams use a standardised kit of materials and document the

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process. All materials in the kits are exactly the same for every team around the world, so there is no unfair advantages. Only Botball sets are allowed in this tournament and the game rules are provided by KIPR during the Botball Instructors' Summit. KIPR develops the annual rules in the time before this summit. The tournament at ECER represents the official European Championship in Botball.

  - **Open tournament**: The Open tournament uses the same rules and game table as in the Botball tournament. However, teams with any robotics set are allowed to participate.
  - **Aerial tournament**: This tournament does not require a game table but a setting for using drones. Aim of this year's tournament was to land the drone at different zones in the game area. Specific rules applied for the robot construction.
  - **Underwater tournament**: This trial workshop/tournament used a small 3D-printed submarine developed by a student employed by PRIA. The Hedgehog controller (further developed in ER4STEM WP5) was used for controlling the vessel. The aim of this tournament was to have the submarine collect small balls and avoid obstacles while doing so.

- **Organisation of material for ECER**: Three game tables and underpinning for them were planned for ECER. Two of them were provided by PRIA (using ER4STEM funding) and one was provided by AL (using ER4STEM funding). A cage for the aerial tournament was assembled using materials provided by AL (using ER4STEM funding). Name tags and printed handouts for the ECER participants were prepared. Spare parts for Botball (in case material of participants breaks) were organised. T-shirts were designed and made available that could be obtained by the participants. EU funding was promoted and visualized in advertising and information materials.
- **Organisation of invited talks**: ECER was carried out in accordance with this year's issue of the International Conference on Robotics in Education (RiE). The RiE is a conference for researchers being active in the field of educational robotics. The RiE was established in 2010 in the frame of the EU project 'Centrobot' and has been organised every year since then. As RiE 2018 was carried out in parallel to ECER 2018, the high school students were able to visit the sessions of RiE. Besides, two talks by researchers were organised specifically for ECER 2018.
- **Submission and review of student papers**: 13 papers were submitted by high school students with some of them having sole authors and others by groups of authors. All papers were reviewed by at least two researchers and 9 papers were selected to be presented. The best 3 of these 9 papers were chosen to be presented in a special session at RiE in order to have also the established researchers as audience.
- **Detailed planning of ECER schedule**: According to the accepted papers, the invited talks and the planned tournaments, the ECER schedule was created (see Section 3.1).
- **Planning of staff**: PRIA staff was planned for manning the registration desk as well as a support desk. Moreover, PRIA employees acted as judges and fulfilled various other tasks during ECER. AL staff organised the logistics and materials provision for the conference.

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3 DESCRIPTION OF ECER 2018

3.1 SCHEDULE

Monday, April 16th		
13:00-14:00	Registration	
14:00-16:30	Open Practice Qualification & Practice	
16:30-17:00	Opening Ceremony	
Tuesday, April 17th		
08:30-10:15	Open Practice	
10:15-12:00	Botball & Open: Seeding Round 1	
12:00-13:00	Lunch Break	
13:00-14:00	Student Talks	
14:00-15:00	Open Practice	
15:00-17:00	Botball & Open: Seeding Rounds 2 & 3	Underwater Tournament
17:00-18:00	Invited Talk	
Wednesday, April 18th		
08:30-12:00	Open Practice	Onsite Presentation (from 09:00)
10:00-12:00	Aerial Tournament	
12:00-13:00	Lunch Break	
13:00-14:00	Student Talks (RiE student session)	
14:00-16:30	Botball & Open: Double Elimination	
16:30-17:30	Invited Talk	
Thursday, April 19th		
08:30-12:00	Open Practice	Robot Showcases
12:00-13:00	Lunch Break	
13:00-14:00	Student Talks	
14:00-17:00	Open Practice	Aerial & Underwater Tournament
17:00-18:00	Dinner Break	
18:00-20:00	Open Practice Disco	
Friday, April 20th		
08:30-10:30	Botball & Open: Finals & Alliances	
11:00-12:30	Awards Ceremony	

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3.2 PARTICIPANTS

ECER 2018 had participants from the following countries:

- Austria
- Bulgaria
- Malta
- Poland

Also participants from the Philippines registered for the conference but did not show up.

11 teams participated in the Botball competition having the following team names:

Country	Tournament	Team Name	School / Organization
Austria	Botball® Tournament	**HTL Saalfelden**	HTL Saalfelden
Austria	Botball® Tournament	**nexus**	HTL Wiener Neustadt
Austria	Botball® Tournament	**private void**	HTL Wiener Neustadt
Austria	Botball® Tournament	**unic**	HTL Wiener Neustadt
Austria	Botball® Tournament	**Talentehaus Botball**	Talentehaus NÖ
Austria	Botball® Tournament	**Nothing to C here**	TGM
Austria	Botball® Tournament	**TLB**	TGM
Malta	Botball® Tournament	**AloyBotics**	St. Aloysius College Sixth Form
Poland	Botball® Tournament	**GG Robot**	Zespół Szkół im. prof. Franciszka Leji w Grodzisku Górnym
Poland	Botball® Tournament	**Science Club ZSP2 Lezajsk**	ZSP2 Lezajsk
Poland	Botball® Tournament	**Science Club ZSP2 Lezajsk 2**	ZSP2 Lezajsk

9 teams registered for the Open tournament:

Country	Tournament	Team Name	School / Organization
Austria	Open Tournament	**Break;**	HTL Wiener Neustadt
Austria	Open Tournament	**Vector**	HTL Wiener Neustadt
Austria	Open Tournament	**Talentehaus Open**	Talentehaus NÖ
Austria	Open Tournament	**Cryptobots**	TGM
Austria	Open Tournament	**SICK Robots**	TGM
Bulgaria	Open Tournament	**Vendom Genesis**	SPGE "John Atanasoff"
Malta	Open Tournament	**Team MCAST**	MCAST
Poland	Open Tournament	**GG Open 1**	Zespół Szkół im. prof. Franciszka Leji w Grodzisku Górnym
Poland	Open Tournament	**GG Open 2**	Zespół Szkół im. prof. Franciszka Leji w Grodzisku Górnym

4 teams participated for the Aerial tournament:

Country	Tournament	Team Name	School / Organization
Austria	Aerial Tournament	**private void aerial**	HTL Wiener Neustadt
Austria	Aerial Tournament	**Talentehaus Aerial**	Talentehaus NÖ
Croatia	Aerial Tournament	**KRIK**	Robotic - informatics Klub Kriz
Poland	Aerial Tournament	**GG Aerial**	Zespół Szkół im. prof. Franciszka Leji w Grodzisku Górnym

2 teams participated in the Underwater tournament:

Country	Tournament	Team Name	School / Organization
Austria	Underwater Tournament	**Talentehaus Underwater**	Talentehaus NÖ
Croatia	Underwater Tournament	**KRIK Underwater**	Robotic - informatics club Kriz

Furthermore, as the International Conference on Robotics in Education (RiE) was hosted in parallel to ECER, the attendants of RiE had the chance to visit ECER. As a consequence, more than 50 international visitors from the following countries were present at ECER:

- Austria
- Brazil
- Bulgaria

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- China
- Czech Republic
- Germany
- Italy
- Japan
- Lebanon
- Malta
- Netherlands
- Qatar
- Portugal
- Russia
- Slovakia
- Slovenia
- Spain
- Switzerland
- UK

4 PROCEEDINGS OF ECER 2018

4.1 STUDENT PAPERS

13 papers were submitted by the Botball teams. They were reviewed by researchers (mostly PRIA staff) and 9 papers were chosen to be presented at ECER. The best 3 papers were chosen to be presented in a special session at RiE so that the high school students had the possibility to show their work also to the international researchers attending RiE. The other 6 papers were chosen to be presented during the student paper sessions at ECER.

Tuesday Session: ***Sensors in Educational Robotics***

- *A comparative study of using colour sensors and raspberry pi camera to track colour detection:* Roderick Vella, Lucienne Micallef, Andrea Abela, Clive Tonna, Owen Xuereb, Brandon Magro
- *Comparison of old and new KIPR sensors:* Kevin Koller
- *Application of ET sensor:* Kamil Szczech Magdalena Tokarz Sebastian Krol Magdalena Kryla

Wednesday Session: ***Projects & Experiments*** at RiE

- *May the ocean be with you! Botball & Environment:* Viktoria Zach
- *Mass Distribution of Moving Robots: an Experiment:* Ida Hönigmann, Manuel Eiwen, Matthias Guzmits, Cornelius Kahofer, Peter Kain, Christoph Schnabl
- *Computer Vision in Botball - Potential & Limits:* Koenigsreiter Simon, Lampalzer Alexander, Maschek Linda, Himmer Fabian, Grill Matthias

Thursday Session: ***Techniques & Applications***

- *Exploring the Wallaby:* Leo Halbritter, Ferris Bartak, Julia Pöschl, Sarah Breit, Fabian Traxler, Fabio Fuchs

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- *The use of closed-loop control systems in Botball:* Adrian Pandjaitan
- *Robotics in Medicine:* Daniel Feller, Markus Gschossmann

4.2 TALKS GIVEN BY RESEARCHERS

Speaker: David Miller, Wilkonson Chair Professor of Intelligent Systems, School of Aerospace and Mechanical Engineering Norman, Oklahoma, USA

Talk: Robots & Babies

Duration: 60 minutes

For babies, crawling is a fundamental skill linked to development far beyond simple mobility. Infants who have cerebral palsy and similar conditions frequently give up trying to master moving across the floor. In turn, the brain stops building and reinforcing connections involved in developing motor skills, leading to further problems with movement later in life.

The Self-Initiated Prone Progression Crawler V3 – or SIPPC3 – is a robot that assists infants in learning to crawl. It consists of a high-tech onesie and a three-legged, wheeled robot. Sensors in the onesie detect a baby's kicks or shifts in weight, and the robot responds by pushing a support platform in the same direction, giving the baby a boost toward where he or she wants to go. The novel idea is the use of a force augmenting motion mechanism to help infants learn how to crawl.

Speaker: Reinhard Grabler, Chairman of Sea Shepherd Österreich – Verein zum Schutz des Meeres (Association for protecting the sea)

Talk: Don’t hope. Work hard

Duration: 60 minutes

Since about 71 percent of the Earth’s surface is covered by oceans it is the largest habitat for animals and thus 95 percent are still unexplored. The world’s oceans are the habitat for about one million species, with between one-third and two-thirds of it still unknown. In addition to that, 70 percent of Earth’s oxygen is produced by ocean phytoplankton. Conserving and exploring the marine environment as well as protecting marine life are objects in the interest of humanity for the persistance of our planet. If the oceans die, we die – but how can we prevent it?

It has long been recognized that the employment of underwater robots have important practical significance, which includes their usage in ocean and marine environmental research. It will be presented how underwater robots are actively used in campaigns of the marine conservation organization Sea Shepherd, in order to prevent the extinction of critically endangered species. Nonetheless, high maintenance, manufacturing, development and research costs as well as systems complexity associated with underwater robots have led to a slower adoption rate and have prevented their wider application. Low-cost underwater robots with relatively lower systems complexity that can be applied to a variety of missions would increase their applicability and rise the market and industry adoption. As the area of underwater robotics matures, there is also an increasing need for a low-cost underwater robot that can be used for research, education and hobby development work. With the Shark the speaker aims to bring maritime technology into the classroom and educates future engineers to work on solutions for saving our oceans.

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4.3 TOURNAMENT RESULTS

4.3.1 BOTBALL

A team's overall score for the Botball tournament was composed of three equal parts:

- Score achieved in the seeding rounds
- Score of the documentation (including the paper)
- Achieved rank in Double Elimination

Tournament	Team ID	Team Name	Seeding 1	Seeding 2	Seeding 3	**Seeding Rank**	Seeding Score	Doc P1	Doc P2	Doc P3	Onsite	Doc Score	**Doc Rank**	Paper	Paper Score	**Paper Rank**	**DE Rank**	DE Score	Overall Score	**Overall Rank**
BOTBALL	18-0188	private void	9	753	414	**5**	0,55503	100	100	100	96	0,98800	**4**	91,0	0,910	**2**	**11**	0,09091	1,59494	**5**
	18-0262	Talentehaus Botball	359	1118	690	**3**	0,73411	100	100	100	100	1,00000	**1**	93,0	0,930	**1**	**6**	0,54545	2,24456	**4**
	18-0362	TLB	0	60	120	**7**	0,35290	100	93,92	100	80	0,92176	**7**	66,0	0,660	**12**	**11**	0,09091	1,23469	**8**
	18-0368	Science Club ZSP2 Lezajsk	8	261	9	**6**	0,42708	100	100	100	83	0,94900	**6**		0,000	**14**	**6**	0,54545	1,44704	**6**
	18-0381	AloyBotics	0	26	30	**9**	0,20828	96	0	100	79	0,62500	**10**		0,000	**14**	**3**	0,81818	1,33896	**7**
	18-0596	HTL Saalfelden	28	27	10	**10**	0,14003	100	100	50	87	0,91100	**8**	72,5	0,725	**7**	**11**	0,09091	1,04894	**10**
	18-0602	unic	1236	395	597	**2**	0,80395	100	100	100	100	1,00000	**1**	85,5	0,855	**4**	**1**	1,00000	2,73145	**1**
	18-0603	nexus	1714	394	1876	**1**	0,98921	100	100	100	88	0,96400	**5**	74,0	0,740	**6**	**4**	0,72727	2,56848	**2**
	18-0617	Nothing to C here	8	15	11	**11**	0,06991	100	50	100	84	0,80200	**9**	75,5	0,755	**5**	**8**	0,36364	1,21205	**9**
	18-0618	Science Club ZSP2 Lezajsk 2	18	82	36	**8**	0,28059	44	58,5	50	68	0,56150	**11**		0,000	**14**	**8**	0,36364	0,92498	**11**
	18-0647	GG Robot	906	874	858	**4**	0,66406	100	100	100	98	0,99400	**3**	69,0	0,690	**9**	**2**	0,90909	2,41515	**3**

4.3.2 OPEN

A team's overall score for the Open tournament was composed of two equal parts:

- Score achieved in the seeding rounds
- Score of the paper
- Achieved rank in Double Elimination

Tournament	Team ID	Team Name	Seeding 1	Seeding 2	Seeding 3	**Seeding Rank**	Seeding Score	Paper	Paper Score	**Paper Rank**	**DE Rank**	DE Score	Overall Score	**Overall Rank**
OPEN	OP-0010	GG Open 1	29	142	237	**4**	0,60670		0,000	**14**	**6**	0,44444	1,05114	**5**
	OP-0014	Break;	194	362	444	**1**	0,97691	66,5	0,665	**11**	**1**	1,00000	2,64191	**1**
	OP-0015	Vector	10	12	14	**9**	0,09065	70,0	0,700	**8**	**8**	0,12500	0,91565	**7**
	OP-0016	GG Open 2	36	11	14	**7**	0,26408		0,000	**14**	**3**	0,75000	1,01408	**6**
	OP-0017	Talentehaus Open	373	108	16	**2**	0,80208	88,0	0,880	**3**	**2**	0,87500	2,55708	**2**
	OP-0018	Vendom Genesis	93	34	57	**5**	0,45890		0,000	**14**	**6**	0,37500	0,83390	**8**
	OP-0019	SICK Robots	0	0	43	**8**	0,17877	65,5	0,655	**13**	**9**	0,00000	0,83377	**9**
	OP-0020	Cryptobots	164	236	145	**3**	0,69595		0,000	**14**	**4**	0,62500	1,32095	**3**
	OP-0021	Team MCAST	42	25	22	**6**	0,35220	68,0	0,680	**10**	**8**	0,12500	1,15720	**4**

4.3.3 AERIAL

A team's overall score was calculated as the mean value of the scores of the best two rounds of that team.

Tournament	Team ID	Team Name	Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	Round 7	Total Score	**Rank**
			Wednesday			Thursday					
AERIAL	AE-0003	Talentehaus Aerial	0,00	70,00	70,00	0,00	0,00	0,00	32,00	70	**2**
	AE-0008	GG Aerial	0,00	10,00	12,00	0,00	24,00	0,00	13,00	18,5	**3**
	AE-0009	private void aerial	0,00	0,00	40,00	240,00	40,00	280,00	240,00	260	**1**
	AE-0010	KRIK	10,00	10,00	10,00	10,00	10,00	0,00	10,00	10	**4**

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4.3.4 UNDERWATER

A team's overall score was calculated as the mean value of the scores of the best two rounds of that team.

Tournament	Team ID	Team Name	Round 1	Round 2	Round 3	Total Score	Rank
	Thursday						
UW	UN-0001	Talentehaus Underwater	20,00	20,00	275,00	147,5	**1**
	UN-0003	KRIK Underwater	25,00	90,00	20,00	57,5	**2**

5 SUMMARY

This deliverable describes activities during preparation and organisation of the ECER 2018. Also it presents the results and outcomes of ECER 2018.

Around 130 students in 26 teams from 4 countries participated in ECER 2018 in Malta.

6 CONCLUSION / OUTLOOK

This deliverable reports on the preparation and implementation of ECER 2018. In this context, it is also usable as a guide for future issues of ECER as well as other conferences that take the ECER concept as basis.

7 GLOSSARY / ABBREVIATIONS

EC	European Commission
ECER	European Conference on Educational Robotics
ER4STEM	Educational Robotics for STEM
REA	Research Executive Agency
STEM	Science, Technology, Engineering, and Mathematics

8 BIBLIOGRAPHY

No references in this document.

9 CALL FOR PAPERS

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ECER 2018

7th European Conference on Educational Robotics

CALL FOR PAPERS

TOPICS

Your Robotics Findings and Improving Botball

STEM Projects: We want to know about your achievements in technology related (research) projects!

Educational Robotics: Do you have plans for or experience with organizing and executing educational robotics activities? Maybe a robotics workshop, or outreach activities for your team. We are interested in your methodology, curricula, outcomes and other key properties of your activity!

Mechanical Engineering: How can Mechanical Engineering know-how be used in Botball, or how can its usefulness be increased? Within or beyond Botball, what notable ME feats have you accomplished? Underline your ideas with 3D CAD models!

Software Development: Do you have tips on software engineering methodology and best practices? Have you implemented a cool hack, algorithm, library, or application? Have you given our Hedgehog some scrutiny? Tell us about it!

Paper Structure

- Abstract
- Introduction
- (State-of-the-Art/Literature Review)
- Concept/Design
- Implementation
- Results/Conclusion

PAPERS

Templates and submission

Submitted papers must follow the two-column format with single-spaced, ten-point font in the text according to the templates. The length of submitted papers can be at most of 5 pages including figures and references. Submit your papers as PDF here:

>> SUBMISSION18.PRIA.AT <<

Submission Deadline:
Mar 17, 2018 (11:59 p.m., UTC+1)
Notification of Acceptance: **Mar 31, 2018**
Final Submission Deadline: **Apr 7, 2018**

Templates: http://www.ieee.org/conferences_events/conferences/publishing/templates.html
- Authors using Microsoft Word should use the A4 template
- Authors using LaTex should include the \document class[conference,a4paper]{IEEEtran} option in their latex file

Follow the instructions in the HOWTO (pdf) document.

All papers undergo a review process. A selected number of papers will be carefully chosen by the program committee for interactive multimedia presentation. The presentation should be up to 10 minutes long and will be followed by a 5 min Q&A. The accepted papers will be available on the conference website. **The achieved paper score will affect the Botball and Open Tournament.**
Failure to follow the templates' formatting can lead to a score deduction of up to 100% and rejection before the review.

Score Calculation:

(partial scores between 0 and 1)

BotballOverall = Seeding + DE + [DocScore + PaperScore] / 2
OpenOverall = Seeding + DE + PaperScore

pria.at
botball.org

10 PRINTED PROCEEDINGS

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CONFERENCE PROCEEDINGS

ECER 2018

7th European Conference on Educational Robotics

Qawra, Malta

April 16th - 20th

Qawra, Malta

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Overview

Botball

The Botball Educational Robotics Program engages middle and high school aged students in a team-oriented robotics competition based on American education standards. By designing, building, programming, and documenting their robots, students reinforce their learning skills.

For more information about the American Botball Season see the Botball Webpage (www.botball.org).

ECER

The ECER is also the venue of the official regional tournament for all teams of the European Botball region. Student teams pit their robots head-to-head in a fast paced, non-destructive regional tournament. Students as well as their teachers give talks about robots, their experience with Botball and can listen to interesting talks of researchers. The tournament likewise to the official Botball tournament in the USA. The Open Tournament will be a different one.

GCER

The GCER features the International Botball Tournament. Each year students, teachers, robotics enthusiasts, and professionals from around the world gather for the annual Global Conference on Educational Robotics. Students and teachers give presentations and exchange ideas on topics that range from curriculum integration to technical aspects of robotics. Professional speakers provide inspiration and insight into their robotics-related topics of expertise. The Global Conference features the International Botball Tournament, as well as the Beyond Botball Challenge for adults.

In season 2018, the European Botball Workshop was held in tgm (Vienna Institute of Technology) in Austria.
13 teams and 72 participants attended a two day workshop and learned a lot about robotics and programming.

Botball Workshop at TGM, Austria

The European Botball Season

The Botball season starts with the PRIA-Season Kick-Off in Vienna. This event is followed by team building and registration for participating activities.

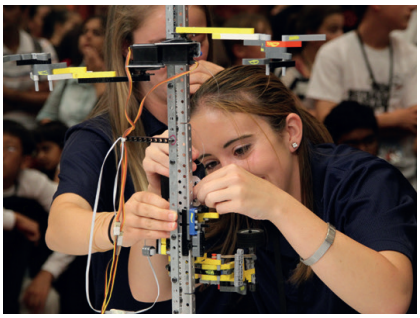
During the three-day development workshop, which is held after the winter holidays, teams will receive their complete reusable Botball® robotics kit. Teams will also learn about current tobotics technology by participating in a variety of interactive exercises and activities. the hands-on workshop covers basic robotic elements, processors, sensors, motors, programming, feedback and control, robot construction and Botball® game rules for the current season.

No previous expirience with robots or programming is requiered!

After the workshop teams have about ten weeks to develope their robots for tournament. In this time, they also need to document their development in English and submit three seperate reports for review.

About ECER

The European Conference on Educational Robotics (ECER) is an international scientific conference for students. Researchers present their findings in engaging talks, show their robots live, and partake as judges in exciting robot competitions, including the official European Regional Botball Competition and the PRIA Open. Participating teams give scientific talks about their robots, projects and experiences in English.



About RiE

The 9th International Conference on Robotics in Education (RiE) is aimed at the presentation and discussion of the latest results and methods in the fields of research and development in Educational Robotics. Researchers are brought together that work on new applications, the latest products, or systems and components for using robotics in schools, in universities and in informal education. The objective is to provide an insight into the state-of-the-art of Educational Robotics to participants from both academic and school education.

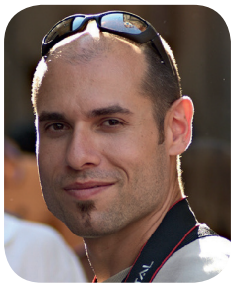
Committees

General Chair
Gottfried Koppensteiner

General Co-Chair
Angele Giuliano

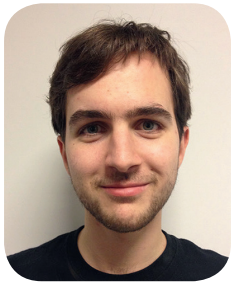
Local Organisation Chair
Jacqueline Bugeja

Publication Chair
Wilfried Lepuschitz



Infrastructure Chair
Annalise Duca

Competition Chair
Clemens Koza



Programm Committees

Daniel Frank
Reinhard Grabler
Christoph Hackenberger
Timon Höbert
Markus Klein
Goffried Koppensteiner
Clemens Koza
Wilfried Lepuschitz
Munir Merdan
Lisamarie Schuster
Nicole Weinert
Martin Wolff
Annalise Duca
Angele Giuliano
Jacqueline Bugeja

ECER - Scheduling

Monday, April 16th		
13:00-14:00	Registration	
14:00-16:30	Open Practice Qualification & Practice	
16:30-17:00	Opening Ceremony	
Tuesday, April 17th		
08:30-10:15	Open Practice	
10:15-12:00	Botball & Open: Seeding Round 1	
12:00-13:00	Lunch Break	
13:00-14:00	Student Talks	
14:00-15:00	Open Practice	
15:00-17:00	Botball & Open: Seeding Rounds 2 & 3	Underwater Tournament
17:00-18:00	Invited Talk	
Wednesday, April 18th		
08:30-12:00	Open Practice	Onsite Presentation (from 09:00)
10:00-12:00	Aerial Tournament	
12:00-13:00	Lunch Break	
13:00-14:00	Student Talks (RiE student session)	
14:00-16:30	Botball & Open: Double Elimination	
16:30-17:30	Invited Talk	
Thursday, April 19th		
08:30-12:00	Open Practice	Robot Showcases
12:00-13:00	Lunch Break	
13:00-14:00	Student Talks	
14:00-17:00	Open Practice	Aerial & Underwater Tournament
17:00-18:00	Dinner Break	
18:00-20:00	Open Practice Disco	
Friday, April 20th		
08:30-10:30	Botball & Open: Finals & Alliances	
11:00-12:30	Awards Ceremony	

RiE - Scheduling

Wednesday, April 18th	
08:00-09:00	Registration
09:00-10:00	**Opening Session:** Keynote Talk – Dr. David Miller
10:00-10:20	Coffee Break
10:20-12:00	**Technical Session 1:** Comprehensive View on Educational Robotics #1
12:00-13:00	Lunch Break
13:00-14:15	**ECER Session:** Four talks by high school students
14:15-15:00	**Poster Session 1:** Various Topics
15:00-15:30	Poster Coffee Break
15:30-17:30	**Technical Session 2:** Workshops, Curricula and Evaluation #1
From 19:00	**Conference Dinner**
Thursday, April 19th	
09:00-09:40	**Invited Talk:** Keynote Talk – Dr. Carina Girvan
09:40-10:20	**Technical Session 3:** Robotics Technologies
10:20-10:40	Coffee Break
10:40-12:00	**Technical Session 4:** Workshops, Curricula and Evaluation #2
12:00-13:00	Lunch Break
13:00-14:15	**Technical Session 5:** Cross Topics in Educational Robotics
14:15-15:00	**Poster Session 2:** Various Topics
15:00-15:30	Poster Coffee Break
15:30-16:45	**Technical Session 6:** Programming Environments
16:45-17:10	**Technical Session 7:** Comprehensive View on Educational Robotics #2
17:10-17:30	**Closing Session**
Friday, April 20th	
08:30-13:00	**ECER Finals and Award Ceremony**
From 13:00	**Cultural Tour - Valletta 2018 Special** (optional)

Prof. David Miller

Robots & Babies

For babies crawling is a fundamental skill linked to development far beyond simple mobility. Infants who have cerebral palsy and similar conditions frequently give up trying to master moving across the floor. In turn, the brain stops building and reinforcing connections involved in developing motor skills, leading to further problems with movement later in life.

The Self-Initiated Prone Progression Crawler V3 – or SIPPC3 – is a robot that assists infants in learning to crawl. It consists of a high-tech onesie and a three-legged, wheeled robot. Sensors in the onesie detect a baby's kicks or shifts in weight, and the robot responds by pushing a support platform in the same direction, giving the baby a boost toward where he or she wants to go. The novel idea is the use of a force augmenting motion mechanism to help infants learn how to crawl.

Invited Talk

April 18th 2018

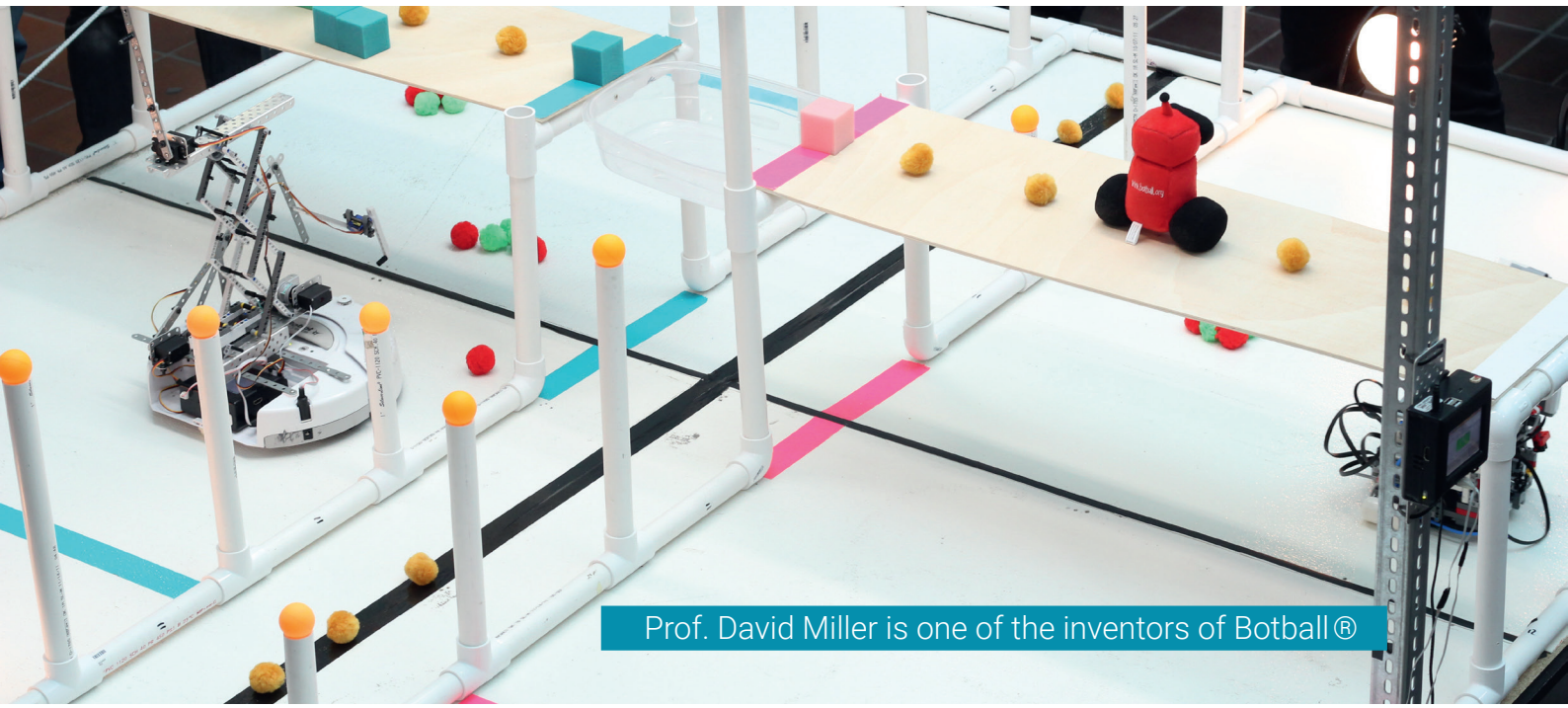
5:00pm - 6:00pm

Short Biography

Dr. David P. Miller is the Wilkonson Chair Professor at the University of Oklahoma with appoint- ments in Aerospace & Mechanical Engineering, Computer Science and Bioengineering.

Prior to joining the University of Oklahoma, Miller was a technical group manager at NASA's Jet Propulsion Laboratory where he led the team developing rovers for the Mars Pathfinder Mission which land- ed on Mars in 1997.

He was also one of the founders of iRobot Corporation and co-founded KISS Institute for Practical Robotics (KIPR) in 1994. At KIPR he helped develop the Botball Educational Robotics Program and continues on as a Director and technical advisor.



Prof. David Miller is one of the inventors of Botball®

Reinhard Grabler

Invited Talk

April 17th 2018

5:00pm - 6:00pm

“Don’t hope. Work hard.”

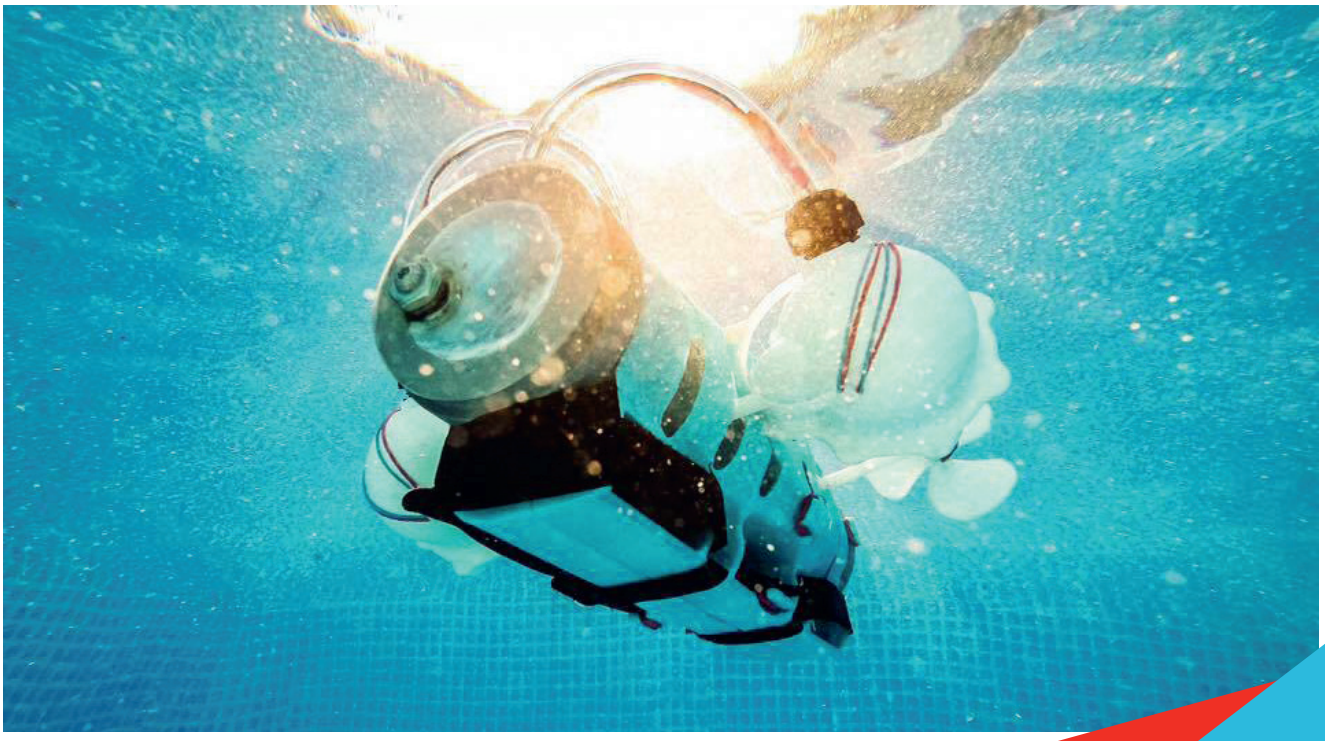
Since about 71 percent of the Earth’s surface is covered by oceans it is the largest habitat for animals and thus 95 percent are still unexplored. The world’s oceans are the habitat for about one million species, with between one-third and two-thirds of it still unknown. In addition to that, 70 percent of Earth’s oxygen is produced by ocean phytoplankton. Conserving and exploring the marine environment as well as protecting marine life are objects in the interest of humanity for the persistance of our planet. If the oceans die, we die – but how can we prevent it?

It has long been recognized that the employment of underwater robots have important practical significance, which includes their usage in ocean and marine environmental research. It will be presented how underwater robots are actively used in campaigns of the marine conservation organization Sea Shepherd, in order to prevent the extinction of critically endangered species. Nonetheless, high maintenance, manufacturing, development and research costs as well as systems complexity associated with underwater robots have led to a slower adoption rate and have prevented their wider application. Low-cost underwater robots with relatively lower systems complexity that can be applied to a variety of missions would increase their applicability and rise the market and industry adoption. As the area of underwater robotics matures, there is also an increasing need for a low-cost underwater robot that can be used for research, education and hobby development work. With the Shark the speaker aims to bring maritime technology into the classroom and educates future engineers to work on solutions for saving our oceans.

Short Biography

Reinhard, born 1991 in Korneuburg, became active for animal rights inspired by the Hardcore music scene. After joining some protests in Vienna, he became active as volunteer for Sea Shepherd Austria.
In 2016 he was nominated as Director, and has since been active in Austria and on international campaigns for the marine conservation organization.

Reinhard is a student in Mechanical Engineering - Management at Vienna University of Technology, and has been working in educational robotics between 2011 and 2017 as co-founder of the Practical Robotics Institute Austria. Next to joining the direct action campaigns of Sea Shepherd, he is actively promoting ocean conservation among engineers, with the Shark – DIY Maritime Robotics project.



Student Paper Presentations

Papers in Session 1: Sensors in Educational Robotics (April 17th 13:00 - 14:00)

Title	Authors
A comparative study of using colour sensors and raspberry pi camera to track colour detection	Roderick Vella, Lucienne Micallef, Andrea Abela, Clive Tonna, Owen Xuereb, Brandon Magro
Comparison of old and new KIPR sensors	Kevin Koller
Application of ET sensor	Kamil Szczech Magdalena Tokarz Sebastian Krol Magdalena Kryla

Papers in Session Students at RiE: Projects & Experiments (April 18th 13:00 - 14:00)

Title	Authors
May the ocean be with you! Botball & Environment	Viktoria Zach
Mass Distribution of Moving Robots: an Experiment	Ida Hönigmann, Manuel Eiwen, Matthias Guzmits, Cornelius Kahofer, Peter Kain, Christoph Schnabl
Computer Vision in Botball - Potential & Limits	Koenigsreiter Simon, Lampalzer Alexander, Maschek Linda, Himmer Fabian, Grill Matthias

Papers in Session 2: Techniques & Applications (April 19th 13:00 - 14:00)

Title	Authors
Exploring the Wallaby	Leo Halbritter, Ferfis Bartak, Julia Pöschl, Sarah Breit, Fabian Traxler, Fabio Fuchs
The use of closed-loop control systems in botball	Adrian Pandjaitan
Robotics in Medicine	Daniel Fellner, Markus Gschossmann

List of Participating Teams

Team Name	Country	Institution
AloyBotics	Malta	St.Aloysius College Sixth Form
GG Robot	Poland	Zespół Szkół im. prof. Franciszka Leji w Grodzisku Górnym
HTL Saalfelden	Austria	HTL Saalfelden
nexus	Austria	HTL Wiener Neustadt
Nothing to C here	Austria	TGM
private void	Austria	HTL Wiener Neustadt
Science Club ZSP2 Lezajs	Poland	ZSP2 Lezajsk
Science Club ZSP2 Lezajs 2	Poland	ZSP2 Lezajsk
Talentehaus Botball	Austria	Talentehaus
TLB	Austria	TGM
unic	Austria	HTL Wiener Neustadt

Break;	Austria	HTL Wiener Neustadt
Cryptobots	Austria	TGM
GG Open 1	Poland	Zespół Szkół im. prof. Franciszka Leji w Grodzisku Górnym
GG Open 2	Poland	Zespół Szkół im. prof. Franciszka Leji w Grodzisku Górnym
SICK Robots	Austria	TGM
Talentehaus Open	Austria	Talentehaus
Team MCAST	Malta	MCAST
Vector	Austria	HTL Wiener Neustadt
Vendom Genesis	Bulgaria	SPGE “John Atanasoff”

GG Aerial	Poland	Zespół Szkół im. prof. Franciszka Leji w Grodzisku Górnym
KRIK	Croatia	Robotic - informatics Klub Kriz
private void aerial	Austria	HTL Wiener Neustadt
Talentehaus Aerial	Austria	Talentehaus

KRIK Underwater	Croatia	Robotic - informatics Klub Kriz
Talentehaus Underwater	Austria	Talentehaus