



Bjelovar-Bilogora participates as an associate partner in a project funded by the IPA Cross-border Programme HU-HR. Lead partner in the project titled "Natural sciences know no borders," the University of Kaposvár while the first Croatian partner in this project is Petar Preradović Secondary Grammar School, Virovitica. The overall project value is € 124,370.75, approved funds from the Instrument for Pre-accession EU assistance amount to € 105,714.82. Estimated project duration is 12 months and the project was launched on 1st September 2011. and will continue up to 31st August 2012. Secondary school Bartol Kašić participates in this cross-border project as Bjelovar- bilogora County 's associate project partner. Approved funds for the BBC amount to € 9,900.00.

The main activities of the project are The Joint Experience Workshop in Kaposvár and The Spring school of physics in Virovitica. This project seeks to popularize mathematics and physics in Hungary and Croatia.

# CrossBorderScience 2012 Final Conference – Kaposvár



## Experience-centered Approach and Visuality In The Education of Mathematics and Physics

August 28, 2012, Kaposvár University, Hungary  
Kaposvár, Guba Sándor u. 40.

1. [PROGRAM](#)
2. [OPENING TALK: Reza Sarhangi \(Towson University, USA\)](#)
3. [SUCCESSFUL PRACTICES](#)
4. [DON'T JUST TALK: DO IT! – WORKSHOPS](#)

**Let's Form Communities!** *The goal of this conference is to draw attention to the new opportunities in the experience-centered education of mathematics and natural sciences and to study together the mathematical and scientific connections in visual arts. We are inviting teachers, educators, scholars, artists, workshop leaders, university students and parents to this meeting. Let's form creative communities for the research of art&science connections in the education of mathematics and natural sciences!*

**Don't Just Talk: Do It!** *As a participant of this conference, You will have the opportunity to meet with internationally recognized specialists of this field, like Reza Sarhangi (Towson University, USA), the president of the Bridges Organization, the world's largest mathematics&arts community, and Slavik Jablan (Mathematics Institution, Belgrade, Serbia), a pioneer of a relatively new study field: the visual mathematics. Our conference includes a workshop session, where everybody can try in practice some successful methods and practices in the experience-centered education of mathematics.*

*All registered participants will get our newly published tri-lingual (Hungarian-Croatian-English) book, called Experience-centered Approach and Visuality In The Education of Mathematics and Physics.*

## REGISTRATION

**Dear Friends, we reached the limit in the number of participants of our conference!**  
More registration are not possible, but you are welcome as an audience of the presentations.

## PROGRAM

**Venue: Kaposvár University, New Building (Új tanügyi épület), Room 170**

### **09.00-9.30 Registration**

*The subscription to the afternoon workshops will take place in the morning at the registration desk in the order of arrival. We would like to offer everyone active participation at our workshops, but due to the large interest, it can happen that some of our guests can “only” observe the workshops. Thank you very much for your understanding, in advance!*

### **09.30-10.00 Welcoming Remarks**

- **Dr. Ferenc Szávai**, Rector of the Kaposvár University
- **András Tálos**, Hungary-Croatia IPA Cross-border Co-operation Programme, programme manager
- **Péter Stickel**, Director of Human Relations, Municipality of Kaposvár City,
- **Dr. Eleonóra Stettner**, Kaposvár University, professional leader of the CrossBorderScience project
- **Slobodanka Polašek**, teacher of the Petra Preradovića High School, leader of the CrossBorderScience project in Virovitica
- **Kristóf Fenyvesi**, (University of Jyväskylä, Finland) leader of the Experience Workshop, the Bridges Organization’s Director of Community Events

### **10.00-10.30 OPENING TALK**

**Bridging Disciplines and Culture, Bridging the World. International Conference of Bridges: Mathematical Connections in Art, Music, and Science. The largest interdisciplinary conference in mathematics and the arts in the world**

by **Dr. Reza Sarhangi** (Towson University, USA)



*During the European Renaissance, art, mathematics, architecture, science, and music flourished side by side. This is no longer the case, and although many artists and scientists are calling for ways to regain the lost mutual understanding, appreciation, and exchange, it has been hard to know how to create environments in which this can happen in a meaningful way. No less a divide exists between mathematics and the general public. All human beings are fluent in recognizing and appreciating patterns, and are able to deal with the abstractions of language, music, visual art, and theatre effortlessly. Yet most people think that they have a latent aversion to mathematics and are largely unaware of how deeply embedded it is in the world around them. Still, we have seen over and over again how fascinated and excited people become when mathematical connections are presented in ways which relate to their experiences and trigger their natural curiosities and aesthetic sensibilities. The International Bridges Conferences, created in 1998 and running annually since, have provided a remarkable model of how these divides can be crossed. Here practicing mathematicians, scientists, artists, educators, musicians, writers, computer scientists, sculptures, dancers, weavers, model builders have come together in a lively and highly charged atmosphere of mutual exchange and encouragement. Important components of these conferences, apart from formal presentations, are gallery displays of visual art, working sessions with practitioners and artists who are crossing the mathematics-arts boundaries, and musical or theatrical events in the evenings. Furthermore a lasting record of each Bridges Conference is its Proceedings – a beautiful resource book of the papers and the visual presentations of the meeting.*

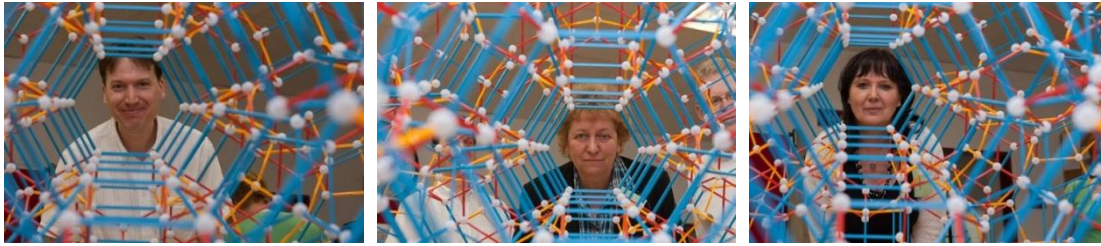
#### **10.30-10.40 BREAK**

#### **10.40-11.00 Experience-centered Approach and Visuality In The Education of Mathematics**

##### **The Experience Workshop International Math-Art Movement**

by **Kristóf Fenyvesi** (University of Jyväskylä, Finland) the leader of the Experience Workshop International Math-Art Movement, **Dr. Eleonóra Stettner**, Kaposvár University,

professional leader of the CrossBorderScience project and **Ildikó Szabó** (ANK-Pécs), the educational leader of the Experience Workshop International Math-Art Movement

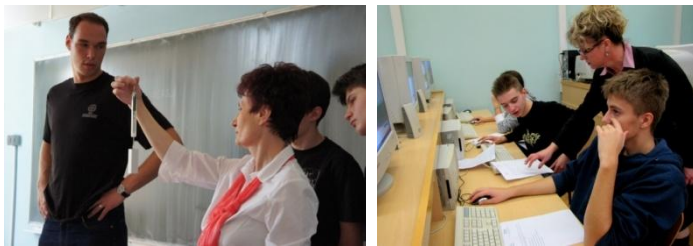


### **11.00-11.15 The share of natural sciences in the curricula of secondary schools in the Bjelovar Bilogora County**

by **Sanja Klubicka**, Vocational School of Polytechnics, Daruvar, Croatia

### **11.15-11.30 Project Report Of The Spring School of Physics in Virovitica**

by **Slobodanka Polašek**, teacher of the Petra Preradovića High School, leader of the CrossBorderScience project in Virovitica



### **11.30-11.45 GeoGebra workshops in the Natural Sciences Know No Borders project**

by **Jasminka Viljevac**, teacher of the Petra Preradovića High School

### **11.45-12.15 COFFEE AND TEA BREAK**

## **SUCCESSFUL PRACTICES**

### **12.15-12.35 Magical Moments In The School**





by **Dr. Kálmán Liptai**, Dean of the Faculty of Natural Sciences at the Eger College, initiator of a number of successful educational innovations

### **12.35-12.55 A Potential Way Of Cognition – Theatre and Drama In Education of Mathematics and Natural Sciences**



by **Zsuzsa Hajós**, president of the Hungarian Student Theatre Association and the writer-actor-dramateacher of the Roundtable Theatre Education Centre

### **12.55-13.10 Early recognition of gifted students interested in natural sciences**

by **Dr. József Berkes**, leading coordinator of the ANK Accredited Talent Center and **Éva Hajnal**, teacher of the ANK-Pécs School Nr. 1.

### **13.10-14.30 LUNCH**

### **DON'T JUST TALK: DO IT! – WORKSHOPS**

#### **14.30-16.20**

### **A Workshop In Construction And Decoration Of Decagram Based Interlocking Star Polygons**

by **Reza Sarhangi** (Towson University, USA) & **Mojgan Lisar** (The Netherlands)



The aim of this workshop is to study different approaches for creating mosaic designs and also decorate them using the art of Tazhib. The common element for the course of study in these designs is a special ten pointed star polygon. This special polygon, which is called a decagram for convenience, is the dominant geometric shape of a series of polyhedral tessellations that all consist of the same common motifs. The decagram can be created through the rotation of two concentric congruent regular pentagons with a radial distance of  $36^\circ$  from each others' central angles. However, to create a decagram-based interlocking pattern, a craftsman-mathematician needs to take careful steps to locate a fundamental region. The rectangular-shaped fundamental regions, which are constructed using radial grids, have different proportions for their dimensions.

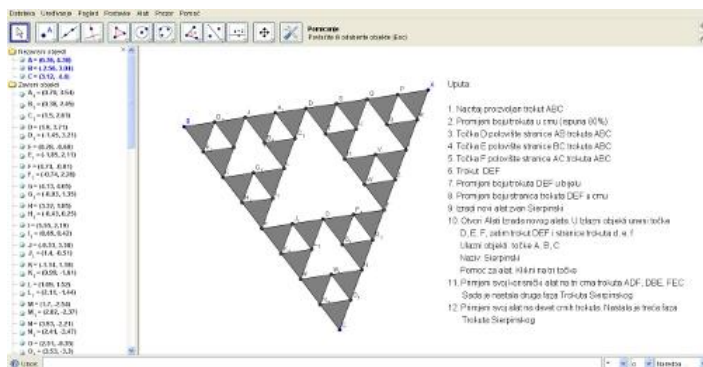
The workshop will continue by decorating and painting individual petals that ten of them will make a full decagram. In this part of workshop attendees will draw the design for a petal and then paint it properly. In the end each ten petals will be attached to a cardboard to make a Tazhib decagram ready to be hanged on a wall!



## GeoGebra Workshop by Jasminka Viljevac

Venue: Room 168

GeoGebra is a mathematical software uniting geometry, algebra and analysis. It was developed by Markus Hohenwarter in 2001. This software has been widely used and developed in Croatia as well. This workshop will show the connection between certain geometric shapes and visual arts.



**16.20-16.30 BREAK**

**16.30-16.50 Education of Mathematics in the Natural Sciences (Thoughts In Connection with an EU-project)**

by **János Karsai**, University of Szeged, Department of Medical Physics and Informatics

**16.30-16.50 CLOSING REMARKS**

Venue: Room 170

**Mathematics Without Words Nor Formulas. Visual Mathematics In The Sciences And In The Education**



by **Dr. Slavik Jablan**, who is the editor of the electronic journal VisMath. He was and is a member of many math-art conferences (Bridges, ISAMA, ISIS-Symmetry, etc.) and exhibitions (AMS, Bridges, etc.). He is a renowned specialist in the mathematical knot theory in the group of the famous Louis Kauffman, and yet still finds time to design a course entitled Visual Mathematics at the Faculty of Information Technology FIT in Belgrade.

**16.50-17.00 BOOKSHOW**

**Élményközpontúság és vizualitás a matematika- és fizikaoktatásban / Doživljaji i vizualnost u centru pozornosti u nastavi fizike i matematike / Experience-centered Approach and Visuality In The Education of Mathematics and Physics**

by **Dr. Slavik Jablan**, **Dr. Reza Sarhangi** and the members of the International Board of Editors.



Other activities:

I. Preliminary Meeting in Kaposvár on 9th November 2011. - Presentation of the workshops and taking responsibility.

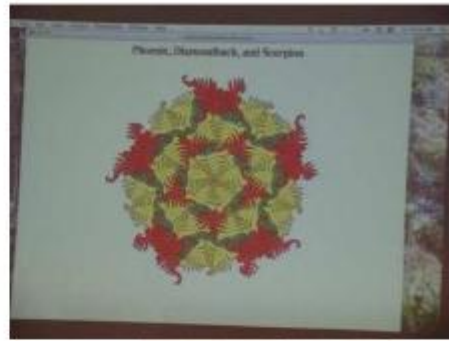
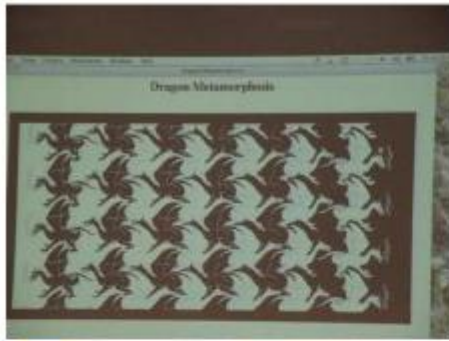
The meeting was attended by members of project teams from the University of Kaposvár and Petar Preradović Secondary Grammar School Virovitica, as well as project manager on behalf of project partner Bjelovar-bilogora County, Head the Administrative Department for European Integrations and International Cooperation Iva Vatrov with project team members of Secondary School Bartol Kašić Grubišno Polje.



II. From 1st to 2nd December 2011. competition in mathematics and The Joint Experience Workshop were held in Kaposvár

- 1st December 2011. - Math competition took place  
Second and third grades' students of the Petar Preradović Secondary Grammar School Virovitica competed with tenth and eleventh grades' students of Secondary school Mihaly Tancsis from Kaposvár

University of Kaposvár prepared competition's tasks (bilingual materials) and our associate project partner Secondary school Bartol Kašić has coordinated and also participated in the translation of tasks.







• 2<sup>nd</sup> December 2011. - 12 Experience Workshops took place (duration of each workshop - 90 minutes) as follows:

1. Assemble-it! Zometool quasicrystal workshop to the honour of Daniel Shechtman, the 2011 chemistry Nobel prize laureate
2. Squids and rays: giant workshop
3. Mathematics, arts and geogebra
4. Poliuniverse workshop
5. Give a hungarian invention as a gift! Hungarian masters, followers and inventions – quiz contest
6. Welcome to the loop: the ultimate möbius experience at the Kaposvár University!
7. The Vasarely playhouse: look and combine!
8. Competitions via World Wide Web: space visualization and symmetry recognition
9. Geometrical games
10. The logical experience
11. The Gondos-playhouse of puzzles
12. Brain-rackers

At 8: 30 a.m. began the opening ceremony of the Experience Workshop. All attendees were welcomed by many distinguished guests.

The Experience Workshop is opened by Mihály Hepp President of the Croatian Minority Self-Government, Dr. László Balogh Dean of The Faculty of Economic Science, Kaposvár University, Dr. Eleonóra Stettner (Kaposvár University), head of Department of Mathematics and Physics, the professional leader of the Cross-Border Science Project, Ivana Bešir the headmaster of the Petar Preradović Secondary Grammar School (Virovitica, Croatia) and Ildikó Szabó (ANK-Pécs, Hungary) maths-physics teacher and the professional leader of the Experience Workshop.

After words of welcome, at 8:45 a.m. began the presentation of famous American mathematician and artist Robert Fathauer called : Puzzles and Art Based on Tessellations and Fractals.

Our colleagues from Grubišno Polje performed at the Experience Workshop with eleven students and four teachers. They participated in the following workshops:

Six of our students participated in the workshop “The gondos-playhouse of puzzles“ by Gábor Gondos Hungarian librarian and game designer (Croatian translation)

Two students participated in the workshop “ Competitions via world wide web: space visualization and symmetry recognition“ (in English, Hungarian translation) by Mateja Budin, head of [Mathema Institute Ljubljana](#) (in English, Hungarian translation)

Three students participated in the workshop “Vasarely Theatre: Watch the Combine!” by Slavik Jablan mathematician at The Mathematical Institute, Belgrade, the founder and the editor of the electronic journal Visual Mathematics (in English, Hungarian translation)

The Experience Workshop was followed by all project team members.

11.55-12.20 : The experience flash: 2 minutes long workshop presentations  
Mirela Horvat, Secondary school Bartol Kašić student presented the workshop “Vasarely Theatre: Watch the Combine!” by Slavik Jablan  
Goals of these workshops was to exchange good practices in the study of natural sciences in cross-border area of Hungary and Croatia, as well as the popularization of mathematics at the target area. They have been fully accomplished.

The total number of participants in this two-day activity in Kaposvár amounted to 300.

Travel and residence in Kaposvar were evaluated as very successful by students and the project team.

Here are some of the impressions of Secondary School Bartol Kašić students:

Marin Cavić: In our workshop we were supposed to visit the International Space Visualization Olympiad website , which we did. We also received a variety of geometric shapes such as triangle, equilateral triangle, etc., and we suppose to merge them in some other forms. It was interesting to try something new and see the geometry in a new light.

Ena Komar: Our workshops are based on logical conclusions led by a professor from Slovenia. The lecture was in English. The main task was to make some molecular structures in 3D from different geometric shapes. Afterwards, we visited the website International Space Visualization Olympiad where we separated the mantle of a body which had to be re-compiled in a short time. This was new and interesting experience!

Una Stamenić: At the beginning of the workshop, Mr. Gondos told us all about his hobby and great passion-puzzles. He uses mostly puzzle that is based on the triangle. Puzzles were in different colors and different shape. Our task was to put together 6 different puzzles, one of which had only one possible solution. Our headmaster has visited us and tried to help us in putting together puzzles. Time has passed very quickly and this workshop was a wonderful experience.

Mirela Horvat: I participated in the workshop : “The Vasarely Playhouse: Look and combine!” by Slavik Jablan. I met students from Hungary and Virovitica. We learned how to combine the cube and the hypercube of transparencies, we put together the puzzles in the form of nodes, using fractals to get interesting patterns. Each participant received a souvenir for a mouse pad designed by Mr. Jablan. There was also award for the fastest and most skilled, and I myself managed to win a prize,so Mr.Jablan elected me to present a workshop on the final presentation. It was a new and interesting experience!



The Programme is co-financed by the  
European Union

Links:

<http://www.hu-hr-ipa.com/>

<http://www.ke.hu/>

<http://bbz.hr/>

<http://www.gimnazija-ppreradovica-vt.skole.hr/>