



ORIGIN

# ORIGIN

art@CMS

cross-disciplinary  
**science education**  
**engagement & networking**



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FSU – Florida State University Tallahassee, US

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## Cross-Disciplinary Exhibitions and EDU program

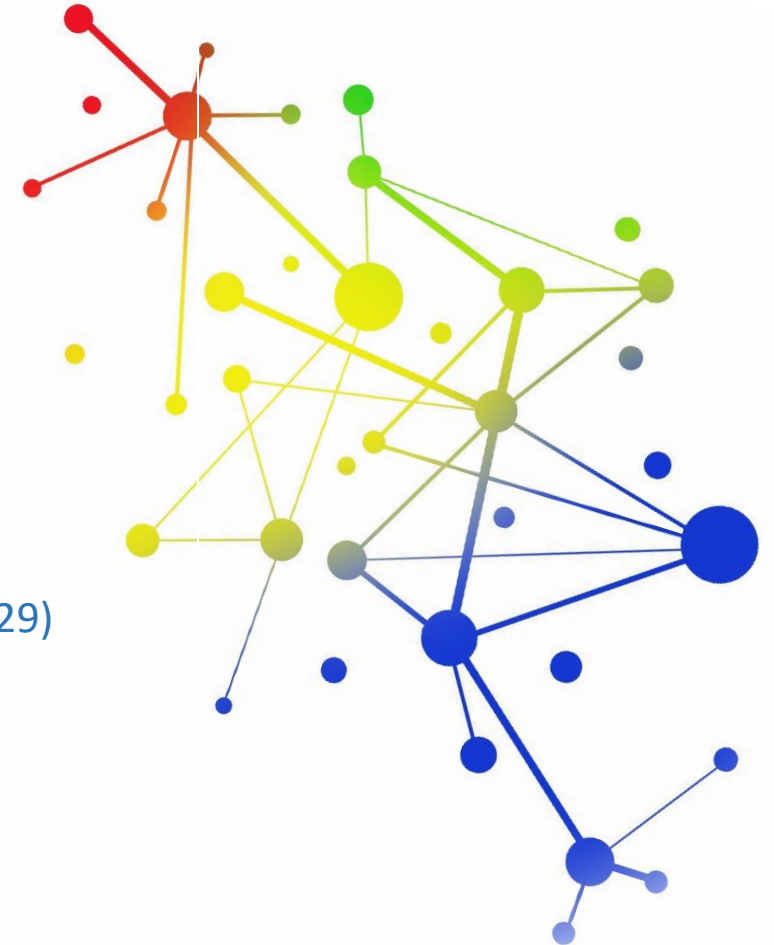
- Cultural Collisions Canada 2018
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### Established and self-sustaining Spin Off programs or collaborations:

- Art&Science across ITALY – by Pigi Paolucci/ INFN (since 2016)
- Creative Science for INDIA – Archana Sharma/ LifeLAB (since 2015)

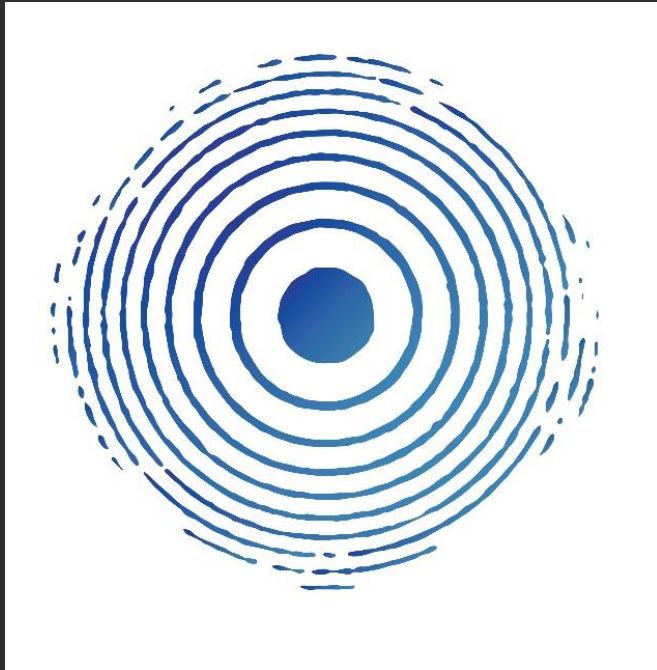
## Urgent Needs to make it sustainable for particle physics community –

Methodology is applicable for diverse science & technology topics or other fields and partners





Since 2017



**ORIGIN**

## Supported by

ATLAS, ALICE, CMS, LHCb,

LIGO, VIRGI, ICEcube, DUNE

Muography, Perimeter Institute,

Canadian Light Source, and other  
international partners

**Particle Physics**

**Astrophysics**

**Gravitational Waves**

**Neutrino-Physics**

**Muography**

**Accelerator**

**Technologies**

Since 2012

## Methology develped & disseminated since 2012

By CMS collaboration via art@CMS

Global cross-disciplilnary science engagement & networking program



# ORIGIN program **Mission**



## Objectives:

cross-disciplinary science **engagement** & **networking** with special emphasis on education

THINK globally ACT locally –

- support our science community where they need support -> at their HOME country

“Arts as a tool to engage actively and empower them to own the topic and allow them to contribute”

(NOT for the sake of the ARTs => art@CERN program)



# ORIGIN: *What We Do*

## *Exhibitions*

The outcome of a dialogue and collaboration between artists, art institutes or communities with our science community. An exhibition or performance will act as catalysts for promoting public interest and understanding of science concepts as well as artistic expressions.

all creative expressions are invited, photo, painting sculpture, music, dance, lyrics, performance ....

## *science & art workshops – for graduate and undergraduate students*

Interdisciplinary in their nature, SciArt workshops enable young people to gain a better understanding of science in general. Participants get inspired and encouraged to foster their own creativity, linked to scientific methodology. Critical thinking is key to cope with the challenges of the 21<sup>st</sup> century.

science learning (masterclass) followed by philosophic discussion and creative art production

The **exhibition** serves always as **framework to support** activities like : presentations, round table discussions, science and creative workshops, meet real artist or scientists, ....

our Scientist and our collaborating professional artists act as authentic **role models for students**

# Cross disciplinary EDUCATIONAL Formats

## 3 models for different implementation scenarios

© Michael Hoch

### 1) sciARTmasterclass

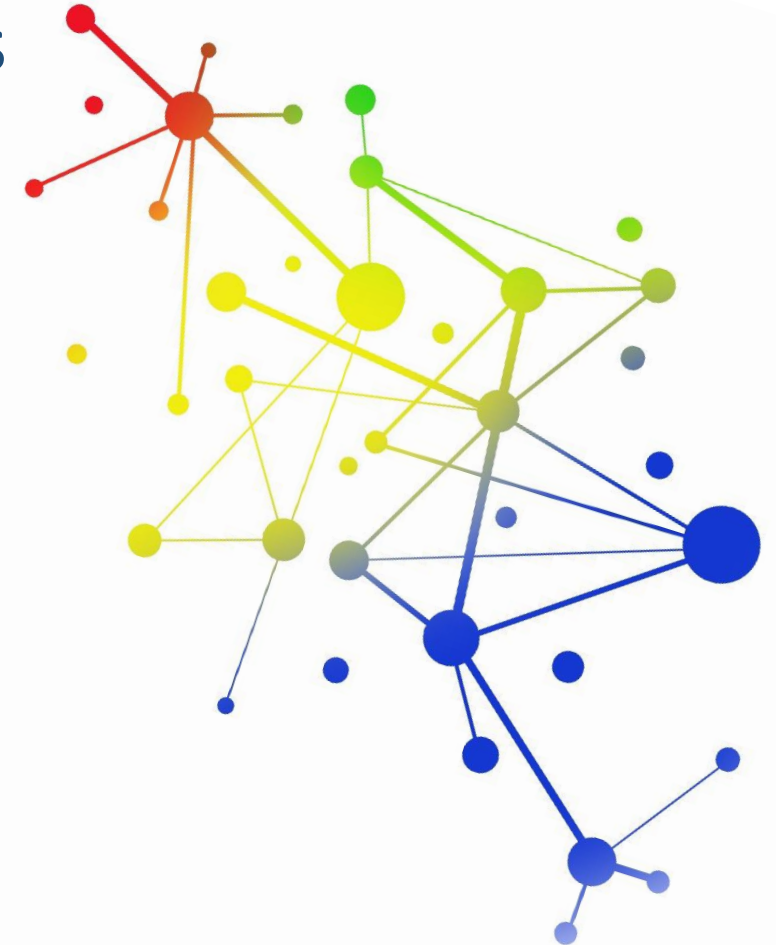
- short engagement scenarios e.g. science festivals

### 2) Science&Art@School

- authentic school student engagement & inspiration

### 3) Cultural Collisions

- full cross disciplinary science engagement inspiration & research






# sciARTmasterclass

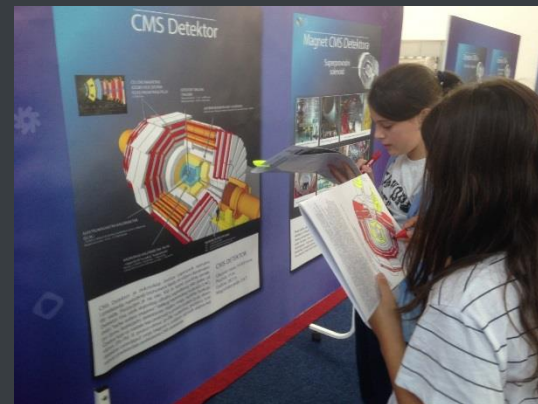

one day event e.g. science festival or science day,..



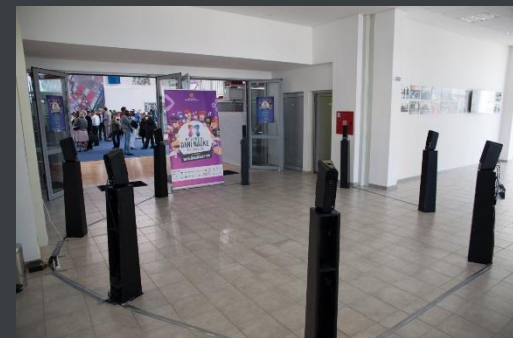
Otvoreni dani nauke  
**Mladi naučnik**  
5-9 godina



Ime: \_\_\_\_\_ Godine: \_\_\_\_\_



Students participating in the ScienceFlashMob,  
**CMS Junior Scientist Program -> Booklet**  
art@CMS interdisciplinary Exhibition with: real detector & accelerator equipment, art works, creative corners , lectures and detector workshops as well as sciART workshops.  
Montenegro 2017: <https://www.youtube.com/watch?v=9vfiW-Pf7vg>  
Athens 2015: <https://www.youtube.com/watch?v=t8MHsCaYks>







# Science&Art@School

supporting school curriculum or after school activity



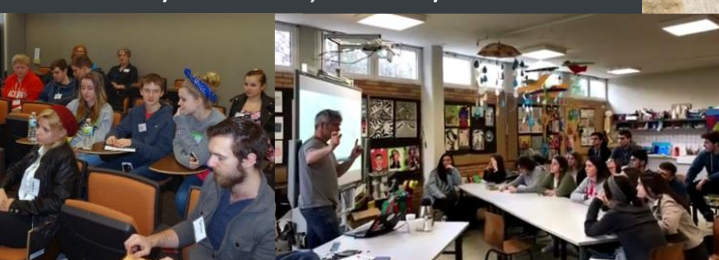
Graz/ AT 2012, 2013, 2014



Sofia Bulgaria 2015, Vienna/ AT 2016



FERMILAB/ US 2015, Athens/ GR 2017



Best National dissemination : Science & Art across Italy <https://web.infn.it/artandscience/index.php/en/> 2016 - 2017 - 2018,

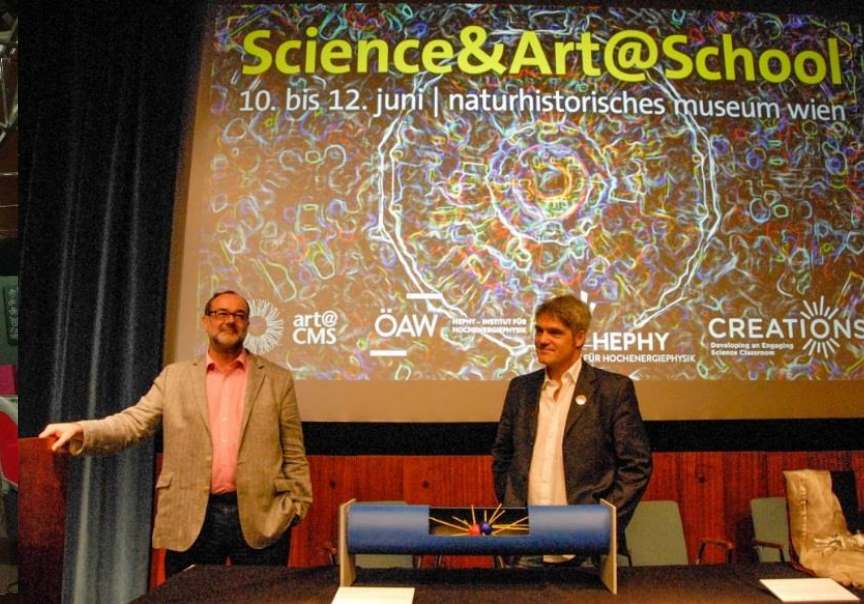


You are cordially invited to  
**Cultural Collisions**

An art exhibition, music and dance performance presented by Austrian and Genevese students



2016 : CERN Bldg 40 became a stage for students



CERN Meyrin Bldg 40 February 24<sup>th</sup> 2017

In the presence of His Excellency Thomas Hajnóczi,  
Permanent Representative of Austria to the international organizations in  
Geneva / Switzerland

18h30 Opening  
19h00 Welcome  
19h15 art show & performance by Haydn Gym. Vienna,  
Herz Jesu Gym. Salzburg, ECOLINT LGB Geneva,  
20h00 Drinks  
21h00 Close



2017 and 2018: NHM – National History Museum Vienna Austria  
2017: Museum fuer Vorgeschichte Halle / Germany



# Cross-Disciplinary Cultural Collisions

## Science & Art

## Education

CC Ontario, Canada

p11

CC Vienna, Austria

p20

CC Bosnia Herzegovina

p24

CC Croatia

p32



# Cultural Collisions Canada

Venue: **Ontario Science Centre, OSC** formal evaluation by the Ministry of Education

**Cross disciplinary exhibition** April 9<sup>th</sup> – 15<sup>th</sup> 2018

**Student exhibition:** May 29<sup>th</sup> – June 3<sup>rd</sup>

**Organization:** **creation of ORIGIN**

**Toronto Ministry of Education:** general and education organization, evaluation

**art@CMS:** Exhibition curation **ORIGIN:** Scientific curation

**art@CMS, ATLAS, CLS, CMS, LIGO/VIRGO, Muography, Perimeter Institute**

More institutions are interested to join: **TRIUMF, Snowlab**



**Cultural Collisions** by ORIGIN - Canada





# Cultural Collisions Canada — week schedule



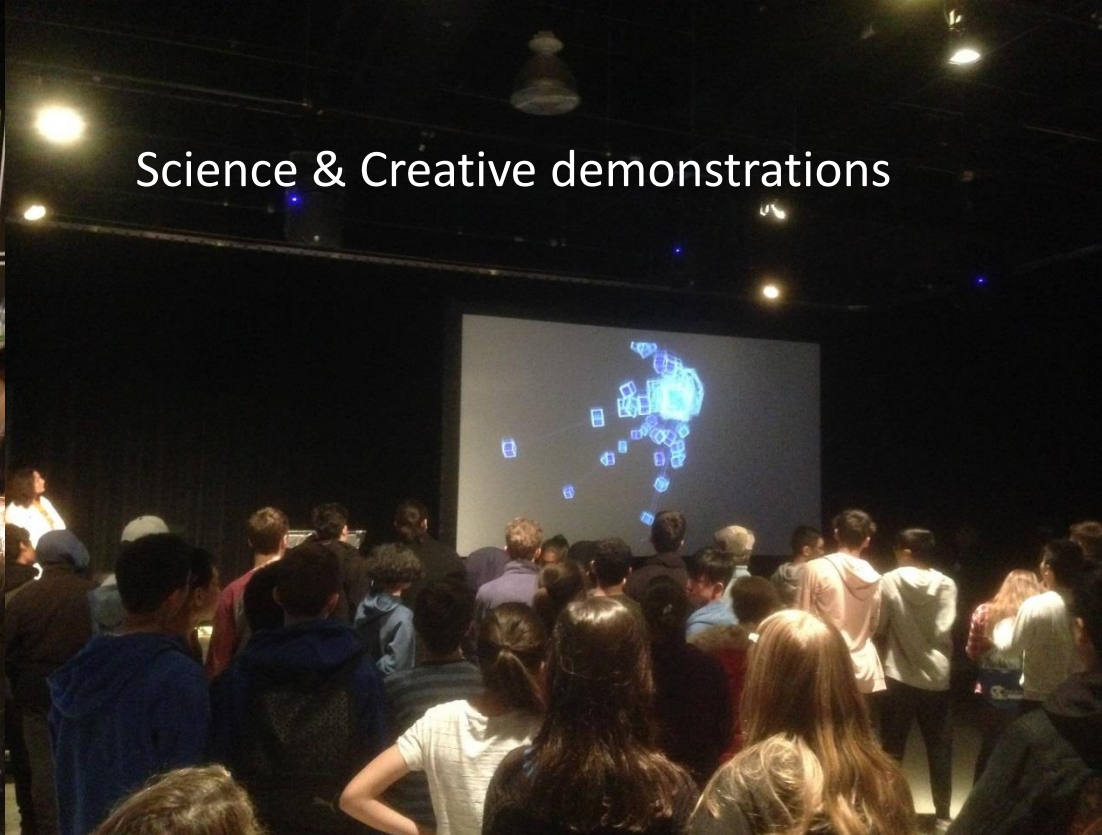
Cultural Collisions Project with Origin - Maximum number of students per day (Tuesday - Friday) is 100 to accommodate workshops - Exhibit can always handle visitors

	Monday April 9, 2018	Tuesday April 10, 2018				Mercredi 11 avril 2018				Thursday April 12, 2018				Friday April 13, 2018				Saturday April 14, 2018	Sunday April 15, 2018
	Schools: Danforth Collegiate, Ecole secondaire Toronto Ouest, University of Toronto Schools	Danforth Collegiate (60 grade 9 and 11 Students) and University of Toronto Schools (6 Grade 11 students) + OSC invitations				Ecole secondaire Toronto Ouest (61 étudiants - 10e et 11e année) - École francophone				University of Toronto Schools (95 students - Grade 8, 10) - Shifted schedule 30 minutes later - Start time is 9:30 am this day only!				Open for Ontario Science Centre Invitations to Participate - York Region Schools				Open to the public - Open at 10 am	Open to the public - Open at 10 am
9:00 AM		20 Minute Talk: Karola Dette, University of Toronto - From Particle Physics to Astrophysics				Mini-présentation: Karola Dette, Université de Toronto - De la physique des particules à l'astrophysique				20 Minute Talk: Karola Dette, University of Toronto - From Particle Physics to Astrophysics				20 Minute Talk: Karola Dette, University of Toronto - From Particle Physics to Astrophysics					
9:30 AM	Opening Event (9:30 - 10:00) - Richard Franz, Maurice (OSC), Rock Paper Science Hall (RPS)	Workshop 1A	Workshop 1B	Workshop 1C	Workshop 1D	Atelier 1A	Atelier 1B	Atelier 1C	Atelier 1D	Workshop 1A	Workshop 1B	Workshop 1C	Workshop 1D	Workshop 1A	Workshop 1B	Workshop 1C	Workshop 1D	Exhibit area activities will be available for the public	Exhibit area activities will be available for the public
9:45 AM		9:30 - 10:30 am	9:30 - 10:30 am	9:30 - 10:30 am	9:30 - 10:30 am	9:30 - 10:30 am	9:30 - 10:30 am	9:30 - 10:30 am	9:30 - 10:30 am	9:30 - 10:30 am	9:30 - 10:30 am	9:30 - 10:30 am	9:30 - 10:30 am	9:30 - 10:30 am	9:30 - 10:30 am	9:30 - 10:30 am	9:30 - 10:30 am	9:30 - 10:30 am	
10:00 AM		What keeps us stuck to the Earth? (EN)	Playing with Data (EN)	Particle Surprise in a Cloud Chamber (EN/FR)	Celestial Luminescence	Qu'est-ce qui nous garde les pieds sur Terre? / What keeps us stuck to the Earth? (EN)	Jouer avec les données (EN/FR)	Surprise de particules dans une chambre à nuages (EN/FR)	Celestial Luminescence	What keeps us stuck to the Earth? (EN)	Playing with Data (EN)	Particle Surprise in a Cloud Chamber (EN/FR)	Celestial Luminescence	What keeps us stuck to the Earth? (EN)	Playing with Data (EN)	Particle Surprise in a Cloud Chamber (EN/FR)	Celestial Luminescence	People to be within the exhibit area to support the programming	People to be within the exhibit area to support the programming
10:15 AM		Perimeter Institute	CMS - CERN, University of Notre Dame	ATLAS, CMS, CERN	York University	Institut Périmètre	CMS - CERN, University of Notre Dame	ATLAS, CMS, CERN	York University	Perimeter Institute	CMS - CERN, University of Notre Dame	ATLAS, CMS, CERN	York University	Perimeter Institute	CMS - CERN, University of Notre Dame	CMS - CERN	York University	Open till 8:00 pm	Open till 6:00 pm
	Science Flash Mob (10:00 - 10:45)	Kelly Foyle and Kevin Donkers	Tom McCauley	Michael Hooh	Robin Kingsburgh	Dave Vrolyk et Nathan Chow	Tom McCauley	Michael Hooh	Robin Kingsburgh	Dave Fish and Damian Pope	Tom McCauley	Michael Hooh	Robin Kingsburgh	Olga Michalopoulos	Tom McCauley	Michael Hooh	Robin Kingsburgh		
10:30 AM		30 students	30 students	30 students	15-20 students	30 étudiants	30 étudiants	30 étudiants	15-20 étudiants	30 students	30 students	30 students	15-20 students	30 students	30 students	30 students	15-20 students	Pop up Public Talks	Pop up Public Talks
		RPS Hall	Room: Workshop 4	Room: Dry Lab	Exhibit area	Salle avec des tables -RPS Hall	Salle: Workshop 4	Salle: Ecosystems Lab	Aire d'exposition	RPS Hall	Room: Workshop 4	Room: Dry Lab	Exhibit area	RPS Hall	Workshop 4	Ecosystems Lab	Exhibit area	11 am - 20 Minute Talk: Peter Krieger, University of Toronto - ATLAS / LHC	
10:45 AM		10:45 am - Talk in Exhibit Area - By Perimeter Institute - Dr. Kelly Foyle, Black holes and the Event Horizon Telescope				10:45 am - Brigitte Tessier, Artiste collaboratrice de la France & Montreal - "QUI DES DEUX INSPIRE L'AUTRE: Le SCIENTIFIQUE ou L'ARTISTE?"				10:45 am - Talk in Exhibit Area - By Perimeter Institute - Dr. Damian Pope - Hidden Patterns in Physics				10:45 am - Talk in Exhibit Area - Peter Krieger					
11:00 AM		Exhibit Area with Scientists and Artists				Aire d'exposition avec les scientifiques et les artistes				Exhibit Area with Scientists and Artists				Exhibit Area with Scientists and Artists				12:00 pm - 20 minute talk: David Griffin (OCAD University)	
11:15 AM	Moderated Panel: Meet the Scientists and Artists! (10:45 - 11:15)													Exhibit Area with Scientists and Artists				1:00 pm - 20 Minute talk: Robin Kingsburgh	
Lunch	11:15 am - 12:00 pm	11:30 am - 12:15 pm				11:30 am - 12:15 pm				11:30 am - 12:15 pm				11:30 am - 12:15 pm				3 pm - 20 minute Talk: Consensus Science Rep	
12:00 PM		12:15 pm - Talk in Exhibit Area - Michael Hooh or Robin				12:15 pm - Talk in Exhibit Area - Peter Krieger				12:15 pm - Talk in Exhibit Area - Peter Krieger				12:15 pm - Talk in Exhibit Area - consensus				Volunteers Coming:	Volunteers Coming:
12:15 PM	Performance of Consensus, interactive component, Scott Wilson with the audience and then Q & A	Workshop 2A	Workshop 2B	Workshop 2C	Workshop 2D	Atelier 2A	Atelier 2B	Atelier 2C	Atelier 2D	Workshop 2A	Workshop 2B	Workshop 2C	Workshop 2C	Workshop 2A	Workshop 2B	Workshop 2C	Workshop 2C	Peter Krieger (ATLAS Canada, Professor, U of T)	Peter Krieger (ATLAS Canada, Professor, U of T)
12:30 PM		12:45 - 1:45 pm	12:45 - 1:45 pm	12:45 - 1:45 pm	12:45 - 1:45 pm	12:45 - 1:45 pm	12:45 - 1:45 pm	12:45 - 1:45 pm	12:45 - 1:45 pm	12:45 - 1:45 pm	12:45 - 1:45 pm	12:45 - 1:45 pm	12:45 - 1:45 pm	12:45 - 1:45 pm	12:45 - 1:45 pm	12:45 - 1:45 pm	12:45 - 1:45 pm	12:45 - 1:45 pm	Michael Hooh CMS
		Listening to Einstein's Universe (EN/FR)	Playing with Data (EN)	Accelerating Colours (EN/FR)	Science through Rap	Écouter l'univers d'Einstein (EN/FR)	Des données créatives au son (EN/FR Maybe)	Accélérer les couleurs (EN/FR)	La science à travers le rap	Listening to Einstein's Universe (EN/FR)	Creative Data to Sound (EN)	Accelerating Colours (EN/FR)	Science through Rap	Listening to Einstein's Universe (EN/FR)	Creative Data to Sound (EN)	Accelerating Colours (EN/FR)	Science through Rap	Wen Yi Song (ATLAS Canada, York University)	Bianca Ciungu (ATLAS Canada Toronto MS)
12:45 PM		LIGO, University of Glasgow	CMS - CERN, University of Notre Dame	CMS - CERN, Collaborative Artist from Montreal working in France	Consensus	LIGO, University of Glasgow	BEER, University of Birmingham	CMS - CERN, Collaborative Artist from Montreal working in France	Consensus	LIGO, University of Glasgow	CMS - CERN, University of Notre Dame	CMS - CERN, Collaborative Artist from Montreal working in France	Consensus	LIGO, University of Glasgow	BEER, University of Birmingham	CMS - CERN, Collaborative Artist from Montreal working in France	Consensus		
1:00 PM	Workshops and Activities in Exhibit Area																	Lisa Cole	Lisa Cole
1:15 PM	Activities in the exhibit area	Martin Hendry	Tom McCauley	Michael Hooh and Brigitte Tessier	Antoine Gittens-Jackson	Martin Hendry	Scott Wilson	Michael Hooh	Antoine Gittens-Jackson	Carl-Johan Haster	Tom McCauley	Michael Hooh	Antoine Gittens-Jackson	Heather Fong	Scott Wilson	Michael Hooh	Antoine Gittens-Jackson	Consensus	Vincent Pascuzzi (ATLAS Canada Toronto F)
1:30 PM	Prompts?	30 students	30 students	20 students	20 students	30 étudiants	30 étudiants	20 étudiants	20 étudiants	30 students	30 students	20 students	20 students	30 students	30 students	20 students	20 students	Brigitte Tessier	
1:45 PM	Interaction with staff, scientists in the staff	Room: RPS Hall	Dry Lab	Exhibit Area	Room: Studio 3	RPS Hall	Workshop 4	Aire d'exposition	Salle: Dry Lab	Room RPS Hall	Workshop 4	Exhibit Area	Room: Studio 3	Room: RPS Hall	Workshop 4	Exhibit area	Dry Lab	Bianca Ciungu (ATLAS Canada MSc Student, Toronto)	
2:00 PM	Artists present in exhibit area	Activities in Exhibit Area with Q & A				Activités dans l'aire d'exposition (questions et réponses)				Activities in Exhibit Area with Q & A				Activities in Exhibit Area with Q & A					
2:15 PM																			
2:30 PM	Departure at 2:30 pm	Departure at 2:30 pm				Départ à 2:30 pm				Departure at 2:30 pm				Departure at 2:30 pm					
		Open till 6:00 pm				Ouvert jusqu'à 6:00 pm				Open till 6:00 pm				Open till 6:00 pm					
						Evening Talk - 7:00 pm													





Science personal dialogue



Science & Creative demonstrations



Creative workshops



Specialized topic talks



General science talks



Young audience



Cloud Chamber Workshop



Life Size Photo Wall



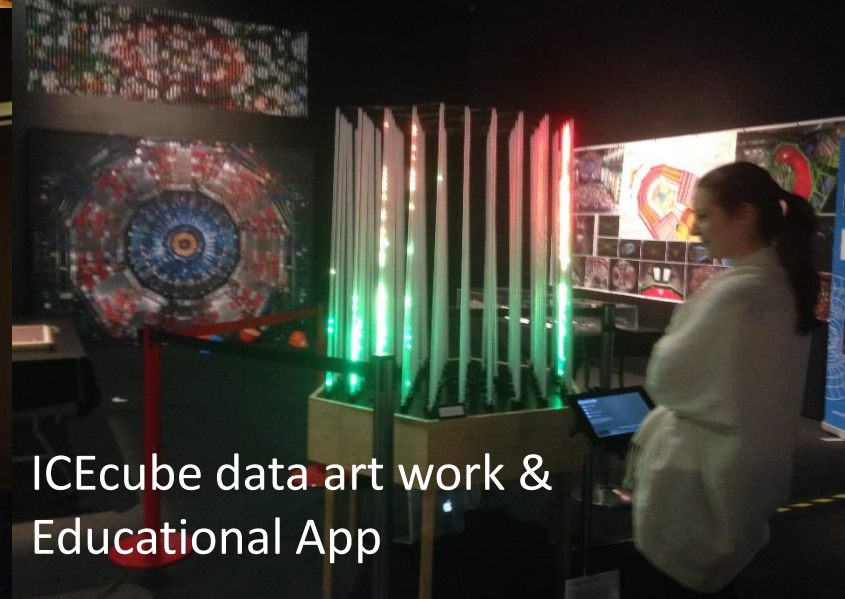
Rap Workshop



Creative Photo Wall



ICEcube data art work & Educational App



General Science Morning Introduction Talk





# Exhibition & Great Conversation Evening

“Science engagement through the Arts”



LHC tunnel Photo wall



Science Centre CEO Maurice Bitrain



Direct dialogue



presentation



Guided tour through the exhibition



Entrance CMS life size photo



# Concert at the Royal Music Conservatory

## Scott Wilson (BEER) world premier "Dark Matter"



Data Sonification Workshop



World Premier "Dark Matter"



Pre Concert Conversation



Pre Concert Conversation

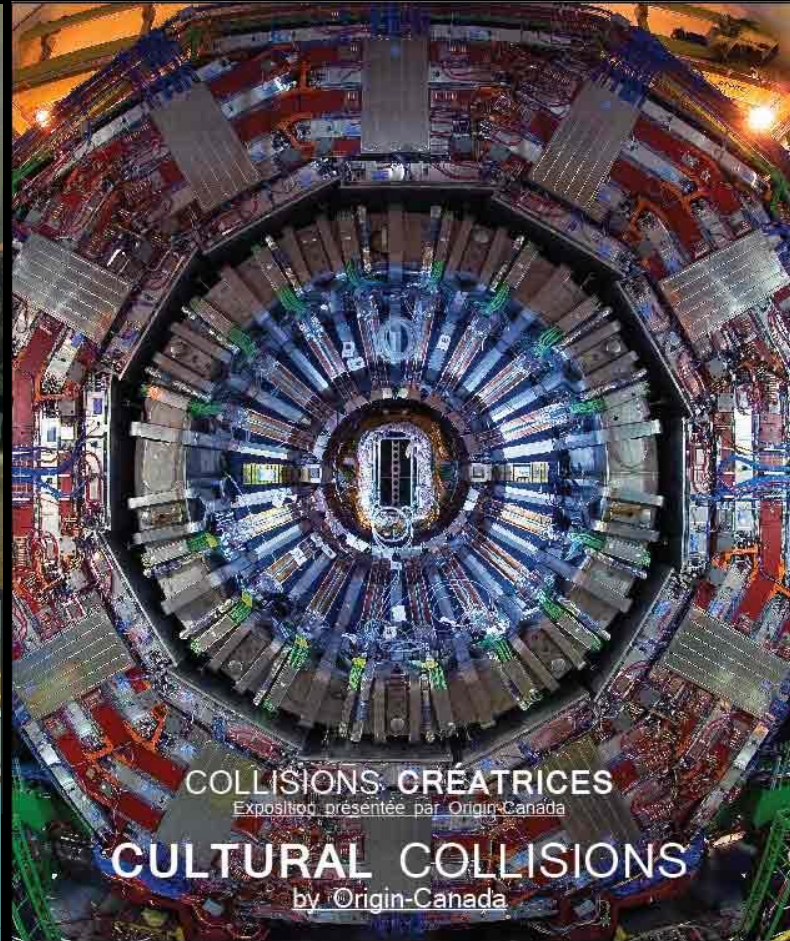


OSC data sonification  
Life demonstration





# Second Exhibition - Student Results - artWorks



COLLISIONS CRÉATRICES  
Exposition présentée par Origin-Canada  
**CULTURAL COLLISIONS**  
by Origin-Canada

STUDENT ART ŒUVRES ÉTUDIANTES  
INSPIRED BY SCIENCE INSPIRÉES PAR LA SCIENCE

From May 29 to June 1, 2018 Du 29 mai au 1<sup>er</sup> juin 2018

Danforth Collegiate and Technical Institute  
École secondaire Toronto Ouest  
University of Toronto School







# Student Exhibition Opening – Rap & Dance Performances



Rap performance & HipHop



# Ontario Ministry of Education evaluation & report



*Some links to documents on the CCC project and the evaluation;  
with courtesy of the Ontario Ministry of Education and Ontario Science Centre;*

## Final evaluation report of the Cultural Collisions Canada

- Exploring the Nexus for Student Learning when the Arts and Science Collide

<https://originnetwork.web.cern.ch/sites/originnetwork.web.cern.ch/files/CC%20Public%20Report%20Final.pdf>

## Final presentation Cultural Collisions Canada

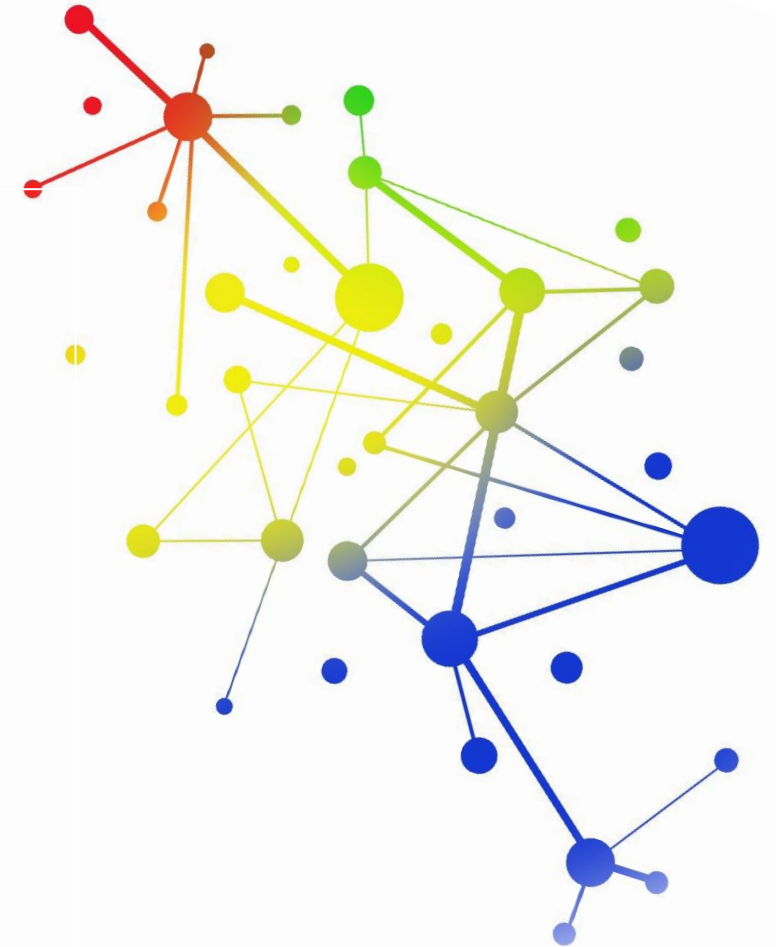
- by Toronto Science Centre & Co

<https://originnetwork.web.cern.ch/sites/originnetwork.web.cern.ch/files/OriginCanadaSlides.pdf>

## video walk through the exhibition

-- Ontario Science Centre

<https://www.youtube.com/watch?v=4Hkrr1mCz7o&t=184s>



<http://originnetwork.web.cern.ch>

# Cultural Collisions Vienna/ Austria

“Meet the Universe” exhibition by HEPHY Institute OeAW & ORIGIN;  
exhibition ‘Aula der Wissenschaft’ September 2019; Cultural Collisions September 2019 – June 2020





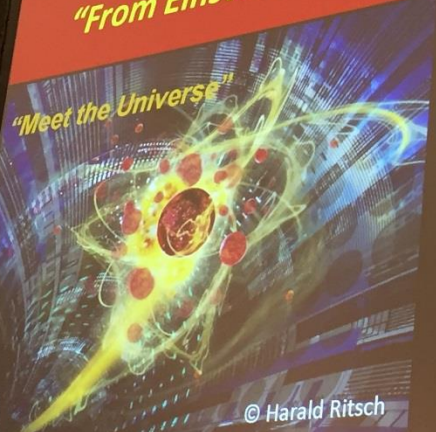






**"From Einstein to Gravitational Waves"**

**"Meet the Universe"**

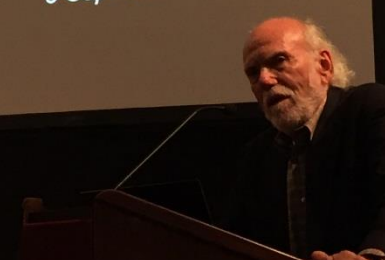


HEPHY  
INSTITUTE OF HIGH ENERGY PHYSICS

art@CMS  
art of science  
beauty in creation

**Barry C Barish**  
Caltech and UC Riverside  
5-Sept-2019

© Harald Ritsch





# Cultural Collisions Vienna outlook

## cross-disciplinary science & art HUB

long terms aim

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### proposed Collaboration following years:

- University of Technology
- HEPHY – Austrian Academy of Science
- MUMOK – Museum for Modern Culture
- TMW - Technisches Museum Vienna
- Kultur Wien
- Bildungsdirektion Wien BDW - Vienna City School Council
- Pedagogische Hochschule Wien





# Cultural Collisions Bosnia and Herzegovina

## PAST, PRESENT AND FUTURE OF UNIVERSE SCIENCE&ART - CONNECTING PEOPLE

Jadranko Batista<sup>1</sup>, Daniela Brill<sup>2</sup>, Azra Gazibegović Busuladžić<sup>3</sup>, Nikola Godinović<sup>4</sup>,  
Mirza Hadzimehmedović<sup>5</sup>, Michael Hoch<sup>6</sup>, Ivica Puljak<sup>4</sup>, Nemanja Rakić<sup>7</sup>, Christoph Schäfer<sup>8</sup>

<sup>1</sup>University of Mostar, Mostar, Bosnia and Herzegovina

<sup>2</sup>Master, Science & Art, University Applied Arts Vienna, Austria

<sup>3</sup>University of Sarajevo, Sarajevo, Bosnia and Herzegovina

<sup>4</sup>University of Split, Split, Croatia

<sup>5</sup>University of Tuzla, Tuzla, Bosnia and Herzegovina

<sup>6</sup>FSU – Florida State University, United States

<sup>7</sup>University of Banja Luka, Banja Luka, Bosnia and Herzegovina

<sup>8</sup>CERN - European Organization for Nuclear Research, Geneva, Switzerland

**Aim:**  
**Schedule:**

to Connect teams from all over BiH  
November 2020 – June 2021

**11 teams in 6 towns:**

- Banja Luka,
- Gradačac,
- Mostar
- Sarajevo,
- Tuzla,
- Zenica

**Every team consists of :**

- Students
- One teacher
- One scientist
- One local artist



austrijski kulturni forum<sup>sar</sup>

DAADCONNECT2020





# Schedule & Planning:

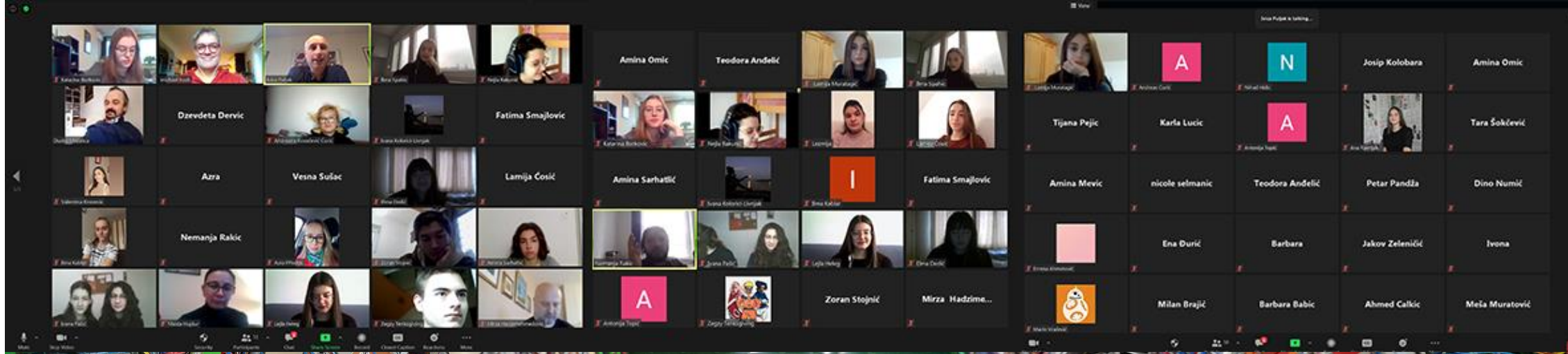
1. **Pre Opening:** install in 4 cities small local inspiration exhibitions:
    - 18 printed posters sent to each town to create 4 local science & art exhibitions for inspiration.
    - All 4 exhibitions sponsored by ACF and DAAD stay permanently with local partners.
  2. **Kick-off online Symposium:** – 6 and 7 Nov 2020; <https://indico.cern.ch/event/970862/>
  3. **First Ideas Exchange Session:** -12 Dec 2020; <https://indico.cern.ch/event/1015445/>
  4. **Second General Rehearsal Session:** - Feb. 16<sup>th</sup> 2021; <https://indico.cern.ch/event/1005605/>
  5. **Virtual Visit to CERN / CMS:** - March 25<sup>th</sup> 2021; <https://indico.cern.ch/event/1018237/>
    - Plenary session contributions by director Austrian Cultural Forum, Science Minister Sarajevo, Vice Rector Univ. Banja Luka, Art Gallery Director Mostar
    - Introduction Presentation & Virtual Visit to CMS/ CERN followed by Q&A session
  6. **3<sup>rd</sup> General Rehearsal session:** - May 26<sup>th</sup> 2021: <https://indico.cern.ch/event/1041786/>
  7. **Closing Hybrid-Vernissage:** - June 18<sup>th</sup> 2021: <https://indico.cern.ch/event/1047913/>
    - International Zoom Conference + 2 physical presents Vernissages (Sarajevo + Banja Luka)
    - Student presentation + Plenary Session with local partners
- **Preview: Kick Off of Cultural Collisions Cycle 2021/2021: Autumn 2021**



# Virtual Visit to CERN / CMS

Dates: March 25<sup>th</sup> 2021, CERN/CMS virtual visit:

<https://indico.cern.ch/event/1018237/>



## Program:

- 10:30 Welcome / Prof. dr. **Mirza Hadžimehmedović**, University of Tuzla
- 10:33 Cultural Collisions – Sci&Art, Dr. **Michael Hoch**, FSU Tallahassee USA
- 10:40 Dir. **Sabine Kernthaller**, MA, Austrian Cultural Forum Sarajevo
- 10:45 Dr. sc. **Melika Husić-Mehmedović**, Science Minister, Higher Education and Youth, Kanton Sarajevo.
- 10:50 Prof. dr. **Biljana Antunović**, Vice-Rector for International and Interuniversity cooperation University of Banja Luka
- 10:55 **Dalibor Nikolić**, Galery Kraljica Katarina Kosača, *Mostar*
- 11:00 START CERN - CMS VIRTUAL VISIT
- lecture: Prof. dr. **Ivica Puljak**, University of Split
- guide at CERN/ CMS: Dr. **Michael Hoch**, FSU Tallahassee USA
- 12:00 Question and Answer session with all experts
- 12:30 Closing

Number of online participants following the zoom event: 556





# Cultural Collisions Bosnia & Herzegovina

Hybrid Vernissage June 18<sup>th</sup> 2021

**PAST, PRESENT AND FUTURE OF THE UNIVERSE - SCIENCE & ART CONNECTING PEOPLE**

**13h – 16h20 General Session:**  
Students of 6 different cities present the results of their creative dialogue Sarajevo, Banja Luka, Mostar, Tuzla, Zenica, Gradačac

**16h30 - 18h General Discussion:**  
Michael Hoch, ORIGIN program leader  
Ivica Puljak, ORIGIN regional coordinator/ Split Mayor  
Mirza Hadžimehmedović, ORIGIN Bosnia & Herzegovina coordinator  
Sabine Kernthaller, Director Austrian Cultural Forum/ Austrian Embassy Sarajevo  
Marcus Bleicher, DAAD /CONNECT 21 project leader  
Christoph Schäfer, CERN  
Melika Husić-Mehmedović, Minister Higher Education and Science, Sarajevo  
Mirza Dautbašić, Vice Rector UNSA  
Sanja Bijakšić, Vice-Rector University of Mostar  
Elvis Baraković, Minister for Science & Education Tuzla  
Vesna Bratovčić, Vice Rector IR UNTZ  
Jasmin Imamović, Tuzla Mayor  
Srđan Rajčević, Minister Science and Technology, Higher Education Republika Srpska  
Goran Trbić, Dean Faculty of Natural Sciences and Mathematics, University of Banja Luka  
Biljana Antunović, Vice-Rector for International and Interuniversity Cooperation, University of Banja Luka  
Suzana Gotvac Atlagić, Assistant Prof. RMSchools Ambassador at Schools 4.0. EIT

**Program:**  
<https://indico.cern.ch/event/1047913/>  
**Zoom:** <https://cern.zoom.us/j/68405785504?pwd=dU13dG9mOVNlL0FVc052NHJlczFqUT09>  
**Zoom Meeting ID :** 68405785504

**Venue:**  
Sarajevo Druga Gimnazija, Sutjeska 1, Room: Kuća Znanja [13h - 18h]  
Banja Luka University, Prirodno-Matematički Fakultet, Mladena Stojanovića 2 [13h - 18h]  
Banja Luka Studentsko pozorište Banjaluka, Ulica Veselina Masleše 20; [20h - 22h]



Hybrid Vernissage June 18<sup>th</sup> 2021

Online Zoom conference

&

2 physical Vernissages venues

- Sarajevo
- Banja Luka

EPS2021 Jul 31<sup>st</sup> Aug.3rd

conference contribution  
Poster session

Paper in preparation

# CULTURAL COLLISIONS

*Bosnia and Herzegovina*

A creative approach to engage on scientific topics.

**November 2020. - June 2021. Authors** Jadranko Batista 1, Daniela Brill 2, Azra Gazibegović Busuladžić 3, Nikola Godinović 4, Mirza Hadžimehmedović 5, Michael Hoch 6, Ivica Puljak 4, Nemanja Rakić 7, Christoph Schäfer 8

1) University of Mostar, Mostar, Bosnia and Herzegovina  
2) Master Science & Art, University Applied Arts, Vienna, Austria  
3) University of Sarajevo, Sarajevo, Bosnia and Herzegovina  
4) University of Split, Split, Croatia  
5) University of Tuzla, Tuzla, Bosnia and Herzegovina  
6) FSU - Florida State University, United States  
7) University of Banja Luka, Banja Luka, Bosnia and Herzegovina  
8) CERN - European Organization for Nuclear Research, Geneva, Switzerland

**Abstract**  
Cultural Collisions is a novel cross-disciplinary science engagement, networking and education programme designed to stimulate the interest of high school students in science by introducing the methods and concepts of art and creativity into their standard science studies. It is based on a unique collaboration of international, national and local partners (scientists, artists and educators), using modern communication tools which in particular facilitate the participation of in city base or rural communities. It provides access to and is supported by science centres and museums through workshops and exhibitions. Cultural Collisions Bosnia and Herzegovina has brought together 11 working groups in 6 different Bosnian cities and has been run entirely online.

During a whole school year, a total of 130 students participated in workshops and 556 in complementary events, including virtual visits and public lectures. They were supported by a unique collaboration of their teachers, local artists, local and international scientists, and demonstrated strong interest and enthusiastic engagement. Their commitment and efforts have resulted in an enhancement of their skills, an improved understanding of big science questions, scientific methodology, and an enhanced ability to discover creative solutions to complex problems. Furthermore, the programme demonstrates that the creative approach to engage on scientific topics encourages an increase in the participation of girls. The program is organized by ORIGIN/CMS following the Cultural Collisions methodology of previous successfully disseminated programs in Canada, Germany, Switzerland and Austria.

**6** Different Bosnian cities    **11** Working groups    **130** Students participating in various workshops

Cultural Collisions is divided into 3 phases:  
1. **Interdisciplinary exhibition / lectures and Workshops:** (beginning of School Year e.g. September or October) - science, technology and art exhibition lectures and workshops held by scientists and artists.  
2. **Elaboration of the topics at schools: (e.g. October – May)** - further research and work of the students with creative supervisors in dialogue with science teachers at the schools.  
Several event should be offered: ideas exchange rehearsal sessions, mentoring and discussion sessions with in international partners/ Virtual Visits to large international Science experiments e.g. CERN  
3. **Final presentation of the students' works: (end of School Year; e.g. May or June)** - exhibition of the themes/artworks created by the students in a museum, possibly again with a supporting program.

**Each team consisted of:**

- Students
- One local artist
- One scientist
- One teacher

**October 2020** - Pre Opening: installation in 4 cities local permanent inspiration exhibitions sponsored by ACF and DAAD  
**6th and 7th Nov 2020** - Kick-off online Symposium: - <https://indico.cern.ch/event/970862/>  
**12 Dec 2020** - First Ideas Exchange Session: - <https://indico.cern.ch/event/1015445/>  
**Feb. 16th, 2021** - Second General Rehearsal Session: - <https://indico.cern.ch/event/1005605/>  
**March 25th, 2021** - Virtual Visit to CERN / CMS - <https://indico.cern.ch/event/1018237/>  
**May 26th, 2021** - 3rd General Rehearsal session: - <https://indico.cern.ch/event/104786/>  
**June 18th, 2021** - Closing Hybrid-Vernissage: - <https://indico.cern.ch/event/1047913/>

Logos: CERN, austrijski kulturni forum<sup>sar</sup>, DAADCONNECT2020, ORIGIN, bozon, and various university logos.





<https://www.connect2020.online>



time	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
		Registration and Testing from 8:00				
09:00 - 09:30	Arrival	Opening and Introduction Marcus Bleicher / Mirza Hadzimedmedovic	Video editing and camera motion tracker Mirza Hadzimedmedovic	Science communication during pandemics Jelena Kollinc	Education system reform Jadravka Batara	Online Science Communication Tijana Prodanovic (online)
09:30 - 10:00		Project writing Sara Caci	Augmented reality technology in education Ksenija Vukob	Iba Milica Babacan (online)	Multidisciplinary approach for science popularization Nermina Rasic	International Networks Marcus Bleicher
10:00 - 10:30		How to write a project proposal and get funds Elvin Almetovic	Can Hasbro help with science popularization? Dulica Maralica	Hands-on session 3	Hands-on session 5	orig@CMS Michael Hoch
10:30 - 11:00		Coffee	Coffee	Coffee	Coffee	Coffee
11:00 - 11:45		Introduction to Science Communication Suzana Vogel	Storytelling Bradley van Paridon	Hands-on session 4	Hands-on session 6	Future of Science and Humanity Ivica Puljak
11:45 - 12:30						Presentation preparation Marina Marjanovic
12:30 - 14:00		Lunch	Lunch		Lunch	Lunch
14:00 - 16:00		Dialogue Forum, Prejudging Groups for hands-on sessions	Dialogue Forum	Common excursion	Dialogue Forum	Dialogue Forum, Preparation for final presentations
16:00 - 16:30		Coffee	Coffee		Coffee	Coffee
16:30 - 18:00		Starting projects / Hands on session 1	Hands on session 2		Hands-on session 7	Final Presentations
18:00 - 18:15	Wrap-Up	Wrap-Up	Discussions / Social Dinner	Wrap-Up	Wrap-Up	



**DAAD - CONNET2021 Collaboration with ORIGIN-CMS  
Cultural Collisions Bosnia and Herzegovina  
Neum/ Bosnia August 8<sup>th</sup> – 14<sup>th</sup> 2021**



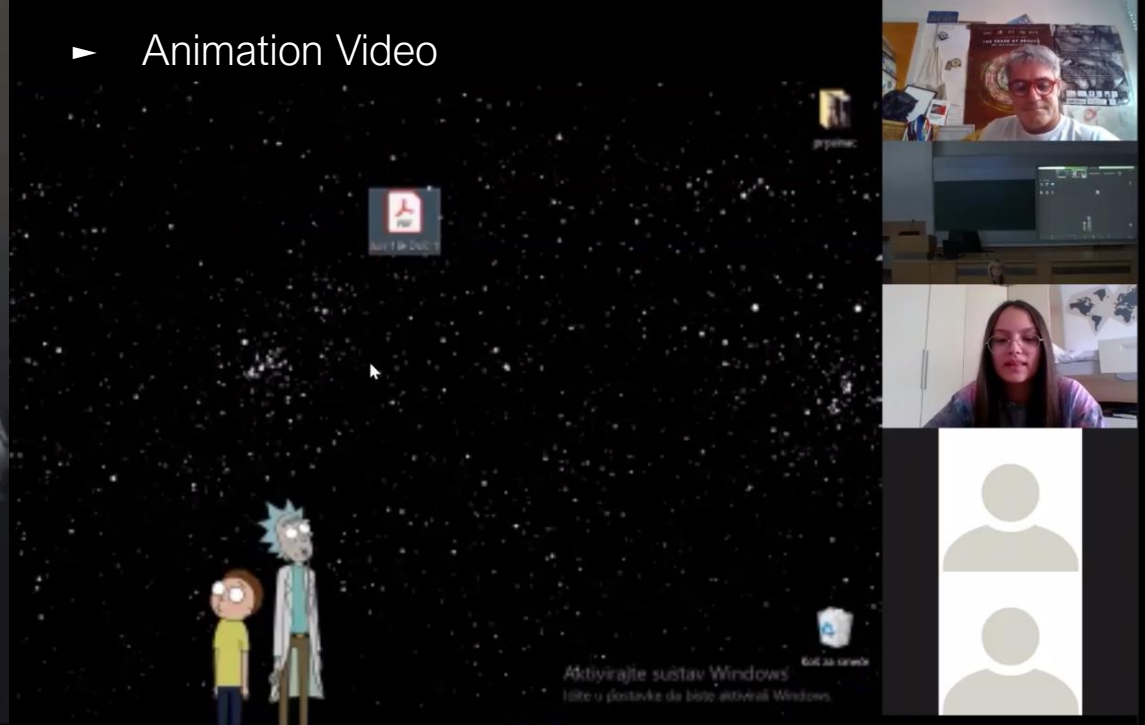


▶ Round Table Discussion

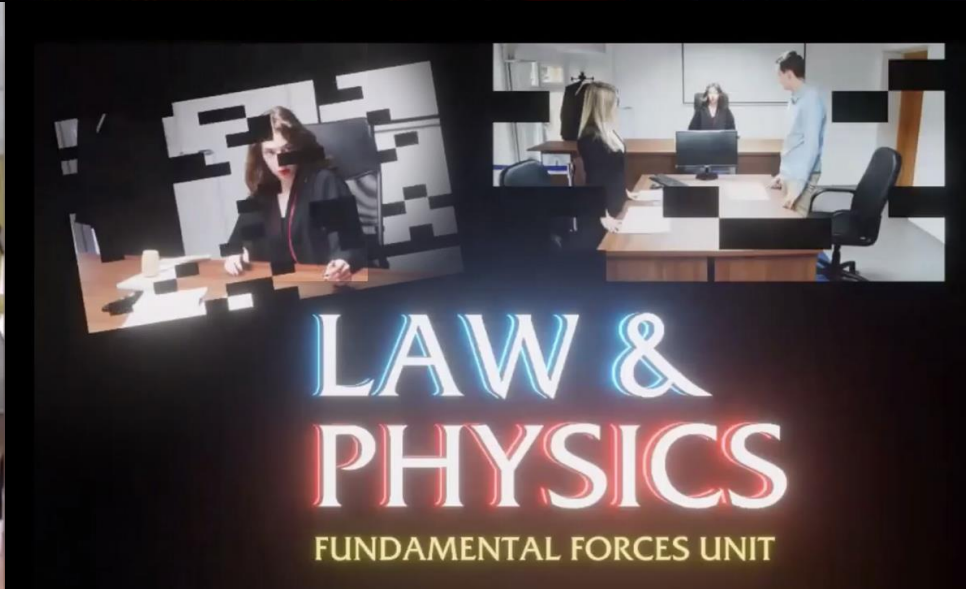


Mira-I research the black holes and that's what attracted me to this project.

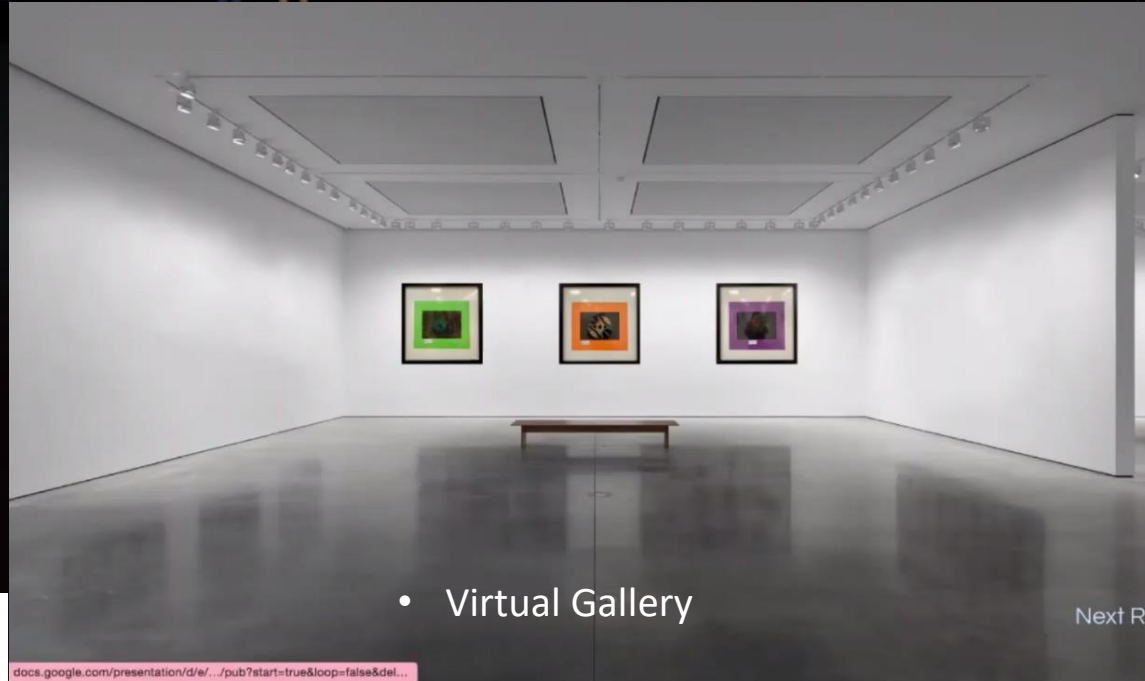
▶ Animation Video



▶ Creative Production



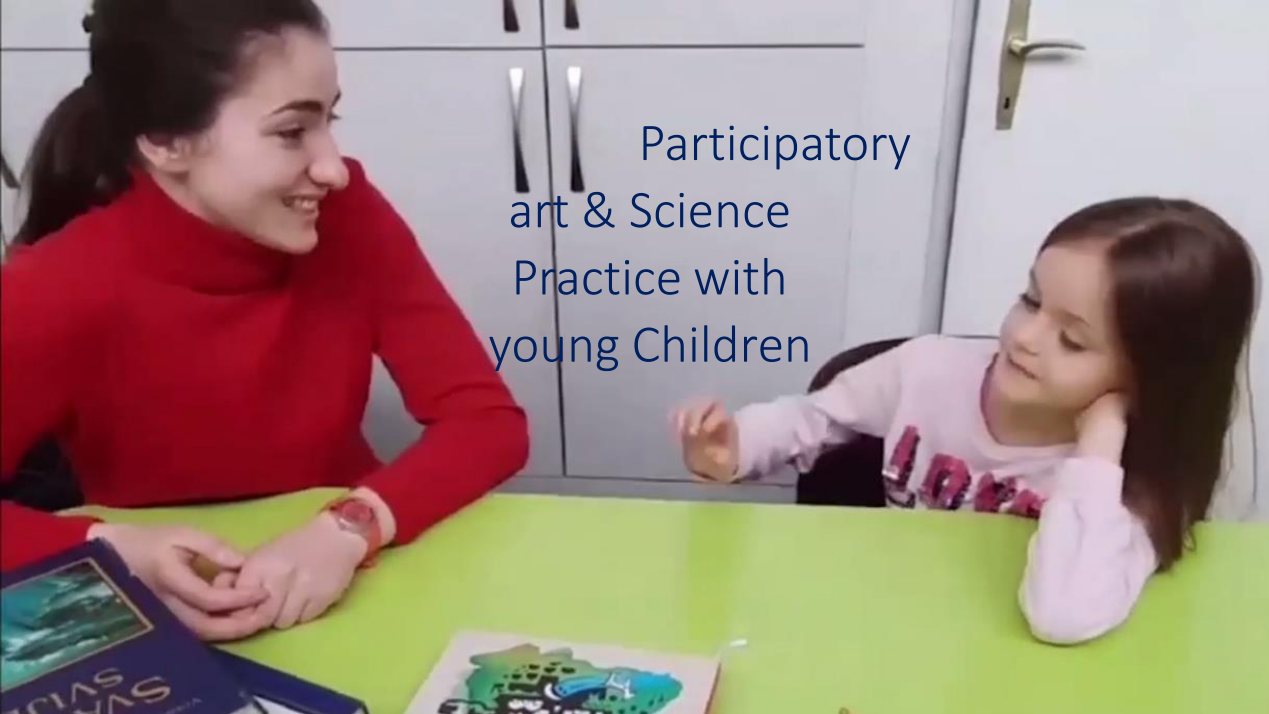
▶ TV Serie Law & Physics Court Room



• Virtual Gallery

Next R





Participatory  
art & Science  
Practice with  
young Children



Theatre Play & Poems



Stop Motion Film



Dance Performance Video



- **Excellent first cycle kick-off – program designed for long term engagement**
- **Enthusiastic Participation and Strong Engagement of Various Communities contributed to the Outstanding Success:**
  - Students / Teachers
  - Regional scientist groups / international science community
  - Local art community / international guests
  - Local and regional support by political opinion leaders, academic institutions
  - Galleries, Theatre, Schools, Radio Stations, TV stations
  - International support by diplomatic institutions
- **Excellent Networking and support by local scientists and local creative & art community**
  - Enthusiasm level high particularly among students and supervisors
  - Passionate engagement of regional and international science community
  - High interest of opinion leaders, higher education institutions as well as local and regional creative community
- **Next steps Cultural Collisions Bosnia and Herzegovina 2022**
  - **Enlarge & Network in the region: Bosnia, Croatia, Montenegro, Serbia**
- **Prepare for funding to make it sustainable**





# Cultural Collisions

by **ORIGIN** – Croatia [September 17th – 21st 2018]



**ORIGIN**

[A walk through the exhibition:](https://youtu.be/XYIDehGg4Xs)

<https://youtu.be/XYIDehGg4Xs>

## workshop program:

### Workshop 1: Thursday 15h

- Gravitational waves - building interferometers
- Martin Hendry, Chiara Mariotti, Nikola Godinović with teachers and students from the Science and Math gymnasiums
- Number of students: about 20 + few teachers

### Workshop 2: Thursday 17h00

- Higgs boson discovery - event display
- Claire Adam Bourdarios, Chiara Mariotti, Ivica Puljak with teachers and students from the Science and Math gymnasiums
- Number of students: about 20 + few teachers

### Workshop 3: Friday 15h

- Gravitational Waves - extreme processes in the universe
- Martin Hendry, Nikola Godinović with teachers and students from the Art school
- Number of students: about 20 + few teachers

### Workshop 4: Friday 17h00

- Creating musics with physics - Arduino and other platforms programming
- Chiara Mariotti, Michael Hoch, Ivica Puljak with teachers and students experienced in robotics + a teacher of music
- Number of students: about 20 + few teachers

### Workshop 5: Friday 18h30

- Origin and evolution of universe
- Nikola Godinović, Ivica Puljak with primary school teachers and students

## public lectures program:

**Tuesday 18h30 Science & Art** - Michael Hoch

**Thursday 18h30 Listening to Einstein's Universe – the Discovery of Gravitational Waves** – Martin Hendry

**Thursday 20h00 Round Table Discussion - Understanding the World Through Arts and Science** – Nikola Godinovic

**Friday 18h30 LHC physics** – James Beacham





# Cultural Collisions by ORIGIN - Croatia



## Science: from Astrophysics to Particle Physics

- First exhibition September 17<sup>th</sup> – 22<sup>th</sup> 2018 Venue: **Old City Hall**  
Research & Inspiration for students
- Second exhibition: do be fixed still
- Public presentation and talks during the **LHC Days in Split / Palazzo Milesi**

## Art: International art@CMS collaborative artists and local artists

### Organization:

**University of Split:** general organization

**art@CMS:** Exhibition curation

**ORIGIN:** Scientific curation

**ORIGIN – South East Europe :**

**art@CMS, ATLAS, CERN, CMS, LIGO/VIRGO, Muographer, University of Split**







# Cultural Collisions – Split /Croatia by ORIGIN train the trainers

During the main exhibition we trained students from primary and secondary schools to act as lectures for following (see next slides).





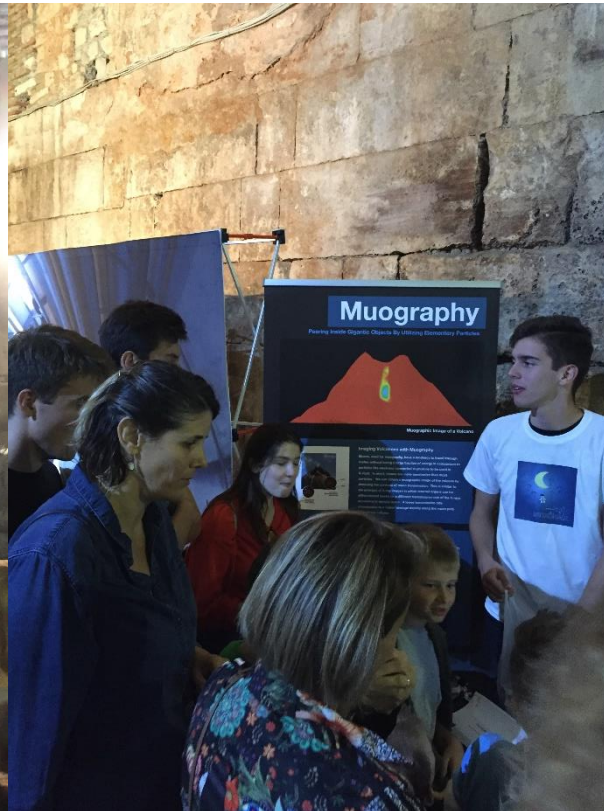


# Cultural Collisions – Split /Croatia by ORIGIN

## Researchers night – September 28<sup>th</sup>

**Format:** students we trained become lecturer to general public and training other students.

Audience during the researchers night: few thousands citizens





# Cultural Collisions – Split /Croatia

by ORIGIN

Four secondary schools – one primary school



**Format:** exhibition and lectures, one day

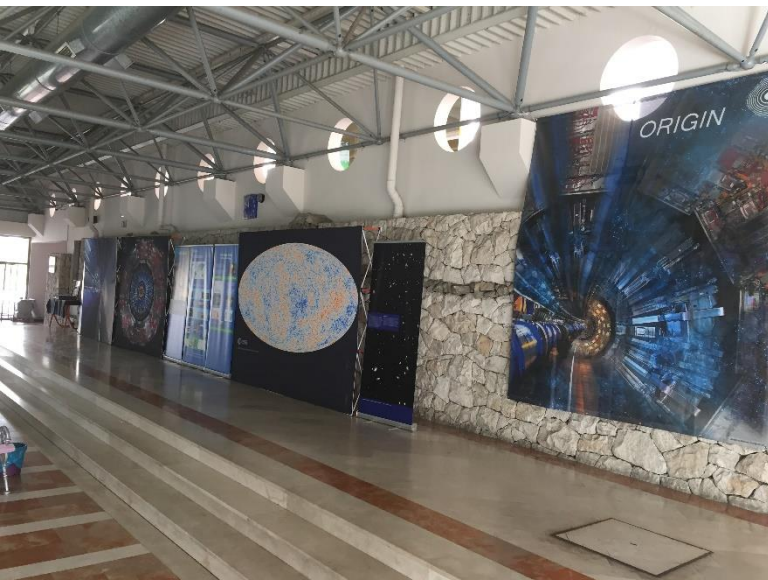
Exhibition presented by **trained students**

Lectures given by **CMS scientists**

**Audience:**

**Primary School** – 100 students participating

**Secondary School** : ~500 secondary students







# Cultural Collisions – Split /Croatia

Visiting primary school – October 2<sup>nd</sup>

**Format:** exhibition & lectures, one day

**Audience:** about 100 primary school students





# Cultural Collisions – Split /Croatia by ORIGIN

Primary school visit – October 29<sup>th</sup>

**Format:** lectures with trained student, training & participation







# Cultural Collisions, Imotski / Croatia by ORIGIN

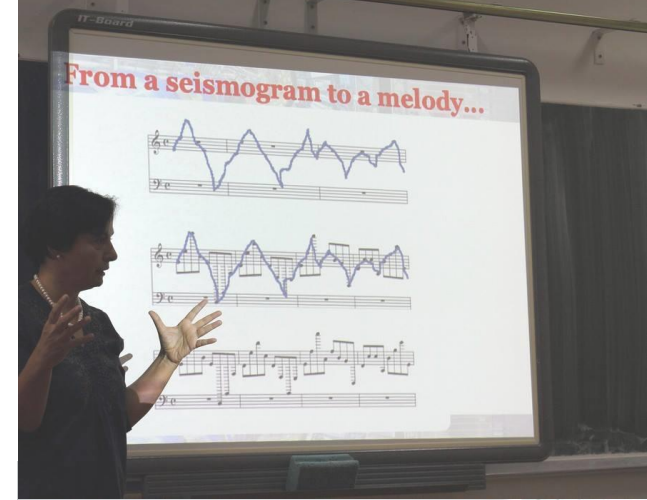
Exhibition and Concert, October 27<sup>th</sup> 2018

**Format:** Exhibition, masterclass, lectures, concert with French and local orchestra

-2 workshops in parallel with 2 teams:

Physics & Music, Gravitational Waves, Playing with data

**Audience: 400 students of 4 school attending lectures and 70 students workshops participants**







# art@CMS – Art University Collaboration

Gallery National Museum, Cetinje/ Montenegro October 2018

**Format:** art exhibition lectures and Cultural Collisions workshop start 3 schools 85 students

Event is the final show of our 2 semester course “art@CMS – Art University Collaboration, 2017/ 2018”

Presentation: Final presentation of 5 university art students + art@CMS collaborative artists

Video walk through the exhibition : <https://youtu.be/UUnBDYhiSlk>







# Science & Art, Sarajevo /Bosnia

by ORIGIN - Fine Art Academy,  
15<sup>th</sup> -22<sup>nd</sup> October 2018

**Format:** cross disciplinary exhibition ORIGIN, public lectures in the exhibition

**Audience:** general public and about high school **students 400 attending lectures**

**Further remark:** Art university Sarajevo requests of art university collaboration





# LHC workshop & cross disciplinary exhibition

Akademia Shkencave Tirana / Albania October 2018

Format: 2 day science workshop enhances by “light art exhibition”, aim: inspire students and general public and build up interest in our science community

Audience: 3 guided tours with High School students + general public conference





# Cross-Disciplinary Exhibitions

Seoul, Korea	p44
Daejeon, Korea	p51
Mustar, Oman	p24
Chateau d'Oex	p32







May 20<sup>th</sup> – October 30<sup>th</sup>

# THE COSMONAUT



우주+人, 과학으로 풀고 예술로 빛다

THE COSMONAUT- a contemporary SciArt exhibition

2021.05.20. THUR – 2021.10.30. SAT

The **Hanyang University Museum** is proud to present a special **international exhibition, ‘The Cosmonaut’**, which explores the relationship between the cosmos and humans through science and art. It introduces and brings together **scientists and artists** who have wondered about the **origin of the universe**.

The international curator of the exhibition, Dr. Michael Hoch, a CMS scientist and artist based at **CERN**, introduces **through art the beauty of the CMS detector**, one of the experiments which discovered the Higgs particle in 2012. Another **CERN experiment, ALICE**, is also featured, along with exhibits from the Nobel Prize winning gravitational wave research team **LIGO**, and the Antarctic neutrino detection team **IceCube**. The Korean teams of **CMS, ALICE, LIGO and ICEcube are partners in the ORIGIN network** supporting **cross-disciplinary science engagement, global networking and education**.

**Korean scientists** participate in all of these experiments and their work is featured in the exhibition alongside artworks of Korean artists who create their own universe in original ways.

The actual **exhibition is supported by an online exhibition** that opens the possibility to view it from anywhere via the internet. In addition, there is a **program of educational activities** such as science and art workshops, presentations, round table discussions etc.

In the time of Pandemic, please join us on this special SciArt journey to space beyond Earth. Director,

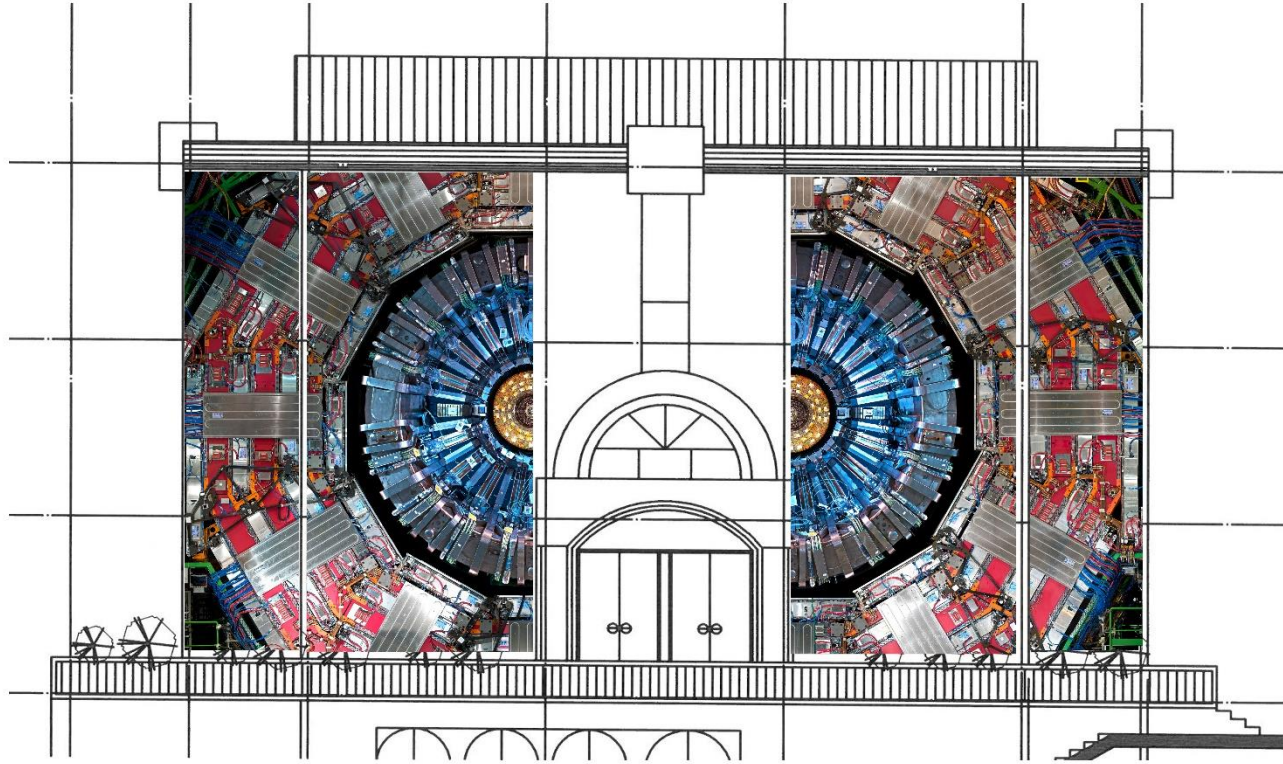
Hanyang University Museum, Ahn, Shinwon







# Museum becomes CMS



***Video: "MUSEUM becomes CMS":***

<https://youtu.be/91rQ2irmsjo>

Art Teaser Video

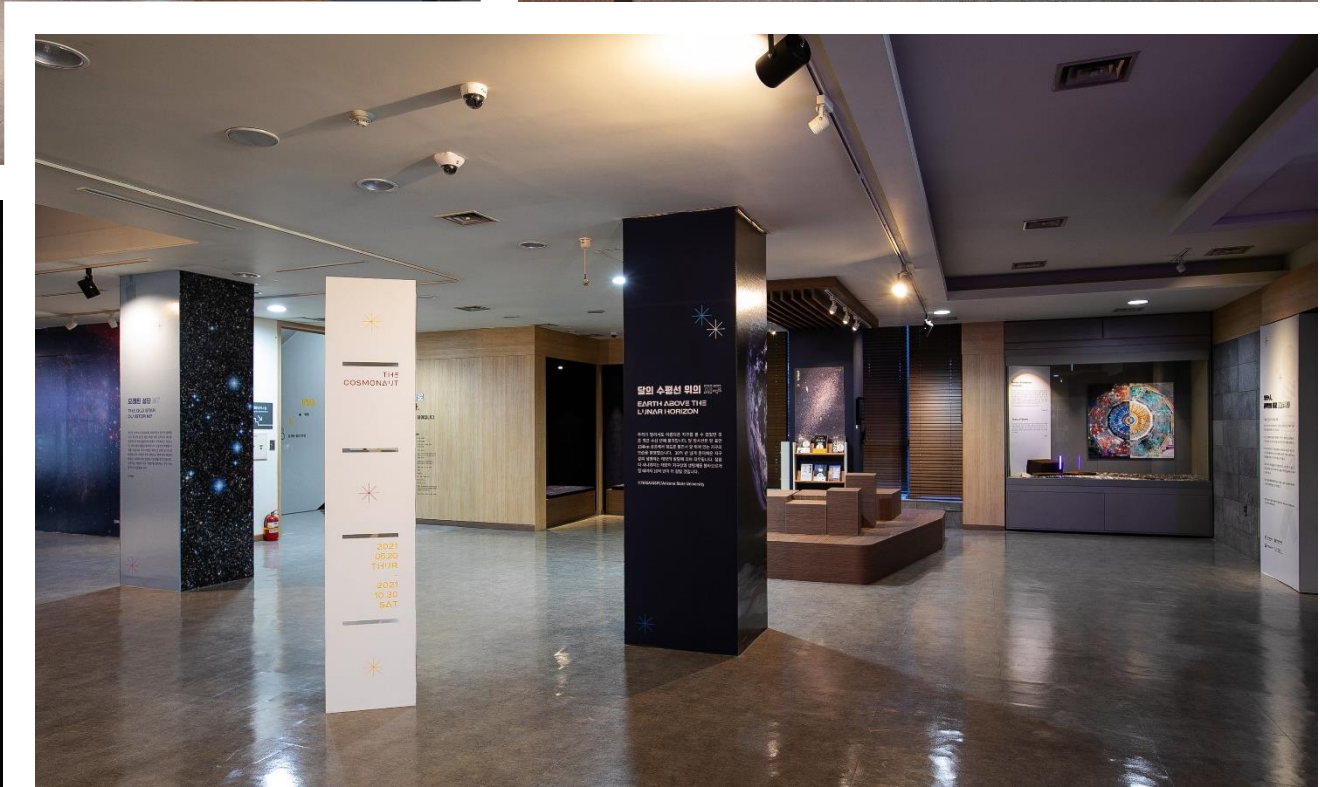
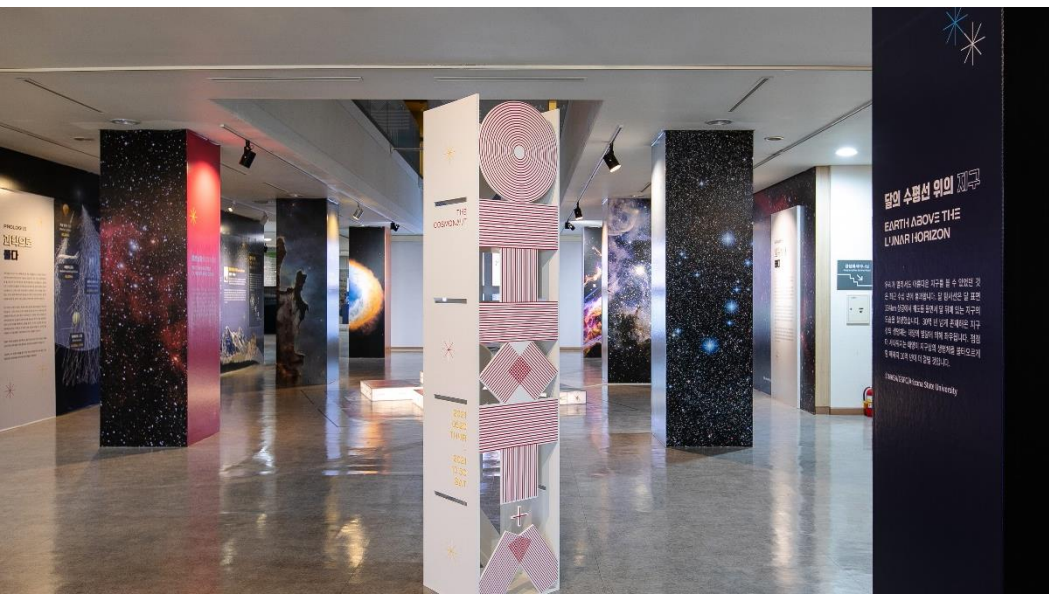
[\(274\) 메인서브 합 마이클호치박사님 - YouTube](#)



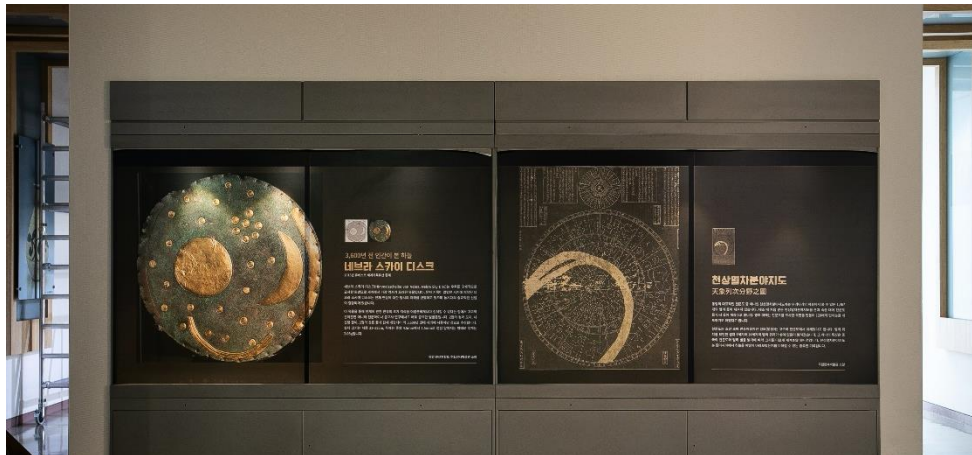














# IBS cultural centre, Daejeon/ Korea April 24<sup>th</sup> – July 26<sup>th</sup> 2019

## “CMS@CERN the art of science”

Cross disciplinary exhibition, science talks, round table discussions, science cafes, Walk through the exhibition : <https://www.youtube.com/watch?v=817V6pY0ImI>

CMS@CERN  
-The Art of Science

### 신을 쫓는 기계

“우리가 새로운 입자도 조사하고(99.9999999%의 확률로 보았을지라도)”

2012년 7월, 유럽 입자물리 연구소(CERN)의 입자물리학자 연구팀이 힉스 입자의 존재를 발표했습니다. 유럽 입자물리 연구소 99.9999999%의 확률로 보았을지라도 증명되었습니다.

신이 살아 있는 것은 신의 존재를 증명하는 가장 강력한 방법입니다. 힉스 입자의 존재를 증명했습니다. CERN은 힉스 입자의 존재를 증명했습니다(LHC:Large Hadron Collider, 대형 강입자 충돌기)로 표현되었습니다. 힉스 입자의 존재를 증명했습니다.

CERN의 과학자이자 예술가 Michael Hochberg, LHC의 주요 실험자인 CMS(Compact muon Solenoid)의 주요 실험자인 CMS를 통해 힉스 입자의 존재를 증명했습니다. 그는 힉스 입자의 존재를 증명했습니다. 힉스 입자의 존재를 증명했습니다.

‘신을 쫓는 기계’라는 첨단 과학 실험 장치인 CMS 고가의 입자물리학을 선보입니다. 힉스 입자의 존재를 증명하고 힉스 입자 실험자인 CMS를 통해 힉스 입자의 존재를 증명했습니다.

이번 전시는 CERN의 CMS를 통해 대중들에게 힉스 입자의 존재를 소개하는 자리입니다. 더불어 힉스 입자 CMS 실험, 입자물리학의 현재와 미래에 대한 힉스 입자 실험에 대한 힉스 입자의 존재를 증명했습니다.

We observe in our data clear signs of a new particle, at the level of five sigma. (Dr Fabiola Gianotti, spokeswoman for the ATLAS experiment at CERN)

The discovery of the Higgs boson announced by CERN's European Organization for Nuclear Research on July 14 2012 was met with local excitement and 'shimmering' around the world. It is a historic milestone that may enable us to come closer to answering the question "Where do we come from?" "What are we?" "Where are we going?"

The Higgs bosons so called "god particles" are believed to disappear immediately after the Big Bang after unleashing mass to matter. CERN experimentally proved the existence of the new particle with results from the Large Hadron Collider (LHC), the world's largest and highest-energy accelerator which explores the secrets of the universe.

As a CERN scientist and artist, Michael Hochberg highlights the extraordinary beauty of a large scientific architecture, CMS (Compact Muon Solenoid), located at the heart of the LHC. His artworks unveil the world of particle physics in a unique way which makes it easier to comprehend for everyone.

Besides "seeking to find the truth of the universe", this exhibition presents photography, collage and installations that capture the mystery and beauty of the CMS detector. You will also be able to follow the process of museum to enhance your understanding of nature by viewing CMS data which reveals the ultimate picture of great achievements in modern physics. The magnificent beauty of the technological scientific architecture makes you marvel about the boundary between art and science.

We hope that you enjoy this unique exhibition which is the first that features CERN and CMS for Korean people. You will also learn about the contribution that Korean CMS and CERN scientists have made in the great attempt to reveal the secrets of the universe.

일시 2019.04.24 - 2019.07.26

시간 10:00 - 17:00(매주 무료입장)

장소 IBS과학문화센터 1층 전시관

대전광역시 유성구 엑스포로55 기초과학연구원IBS

문의 042.878.8185 / rpsa0417@ibs.re.kr / www.ibs.re.kr

DATE 2019.04.24 - 2019.07.26

TIME 10:00 - 17:00

(입장료 없음, 매주 월요일)

(입장료 없음, 매주 월요일)

PLACE IBS Exhibition Hall,

1F of the IBS Science Culture Center,

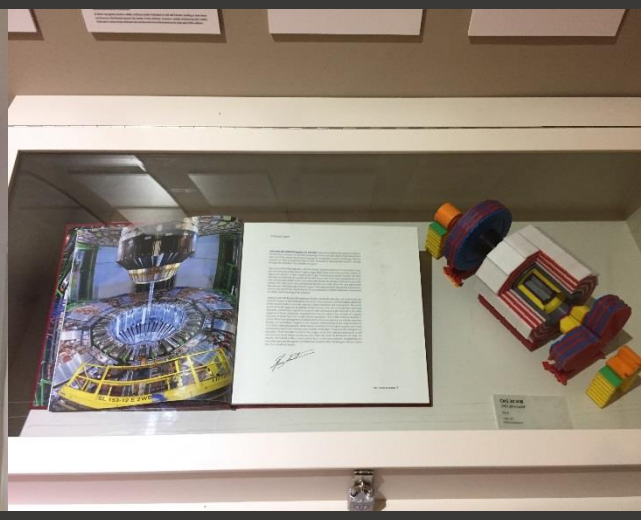
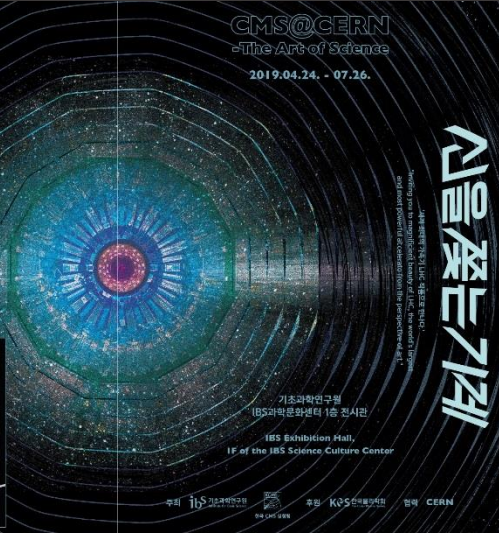
Industrious Road: Science 55, Expo-ro,

Yuseong-gu, Daejeon, Korea

INQUIRY 042.878.8185

rpsa0417@ibs.re.kr

www.ibs.re.kr





# IBS cultural centre, Daejeon/ Korea

April 24<sup>th</sup> – July 26<sup>th</sup> 2019

next exhibition venue in preparation; Seoul (April – July 2020)



**T H E**  
**A R T**  
**O F**  
**SCIENCE**

과학의 아름다움

IBS < 신을 쫓는 기계 > 展 기념 마이클 호처 작가 대중강연

2019.04.24.wed. 17:00 — 18:00

IBS 본원 이문동 8109 | 대전광역시 유성구 엑스포로 55 기초과학연구원







# Cooperation with the Ministry of Education Oman Oman Science Festival 2019

Michael Hoch for CMS and the art@CMS & ORIGIN team





# Contact with Oman Education Ministry and Geneva Mission since 2015

2017, Invitation to the Oman Science Festival – Michael Hoch keynote presentation at the opening about interdisciplinary science education.





# Oman Science Festival 2019

- M. Hoch received an Invitation to present an exhibition of the style IBS cultural center Daejeon, Korea 2019 <https://www.youtube.com/watch?v=8I7V6pY0lml&t=241s>

- Requested Educational program: lectures and workshops on science & art

## Target audience:

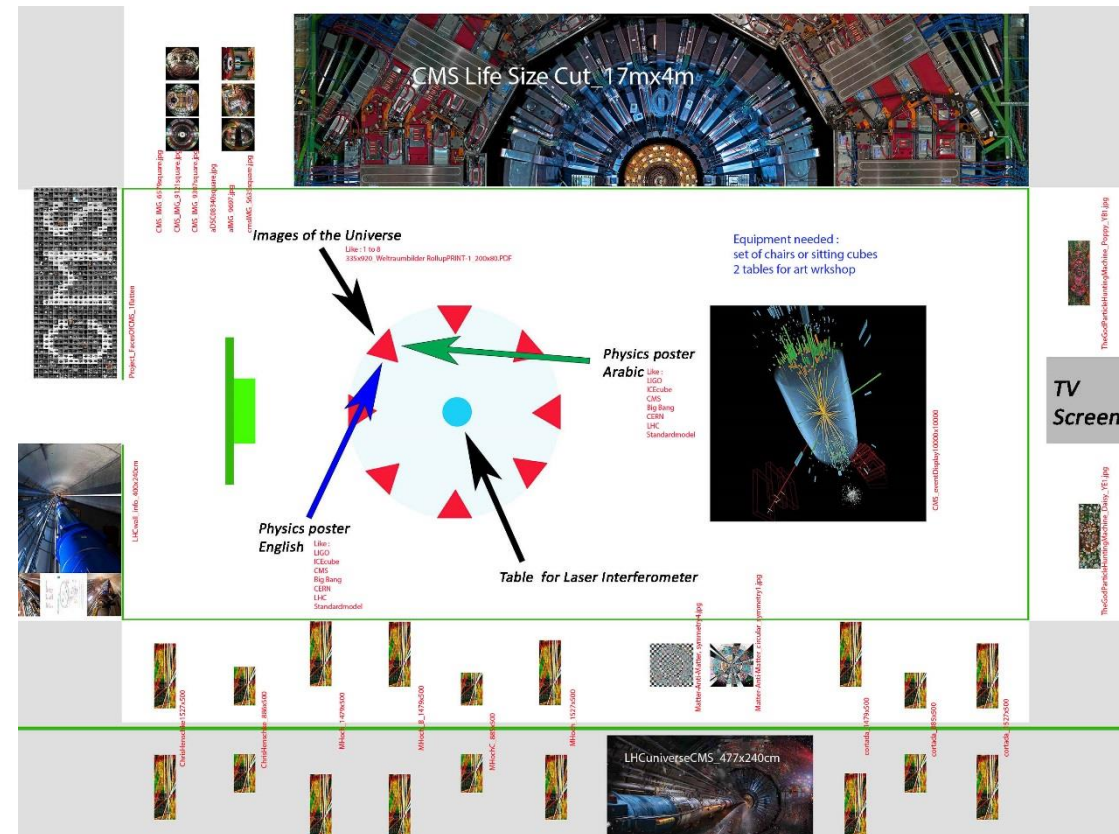
- 1) high school teacher
- 2) high school students
- 3) primary school students

- Introduce “Cultural Collisions” format, style Ontario Science Centre Toronto/ Canada 2018 for a possible project in Oman 2021

<https://www.youtube.com/watch?v=4Hkrr1mCz7o>



Floor plan OSF2019





# art@CMS Korea -> ORIGIN Oman [to inspire for big Cultural Collisions]

<https://www.youtube.com/watch?v=8I7V6pY0lml&t=241s>

- Exhibition venue:

Convention Centre Muscat

'Meet the Universe' exhibition 210m<sup>2</sup>

- Science Topics:

particle physics: CERN & ATLAS, ALICE, CMS, LHCb

Gravitational waves: LIGO, VIRGO

Neutrino physics: ICEcube

- Contributions talks, lectures workshops:

Martin Hendry / LIGO

Michael Hoch / CMS

Amr Radi & Team / Local University

- Contributions material:

- Handouts CERN, ATLAS, ALICE, CMS, LHCb

- Laser interferometer : LIGO, VIRGO

- Detector Hardware: CMS





# Oman Government in the exhibition “Meet the Universe”

Secretary General of the  
Council of Ministers

*Minister of Education*



*Minister of Information Technology*







## Using the exhibition to perform :

- Talks
- Lectures
- Guided exhibition tours
- Workshops
  - Science
  - Creative

## Audience:

- Government
- High school students
- Primary school students
- University students
- General Public
  
- Presentations given by







Lectures by  
Dr Amr Radi & SQU  
team  
Local Scientists,  
Particle Physics/ CERN

Dr Martin Hendry LIGO  
Gravitational waves &  
Astrophysics

Dr Michael Hoch CMS  
Particle Physics /CERN &  
Educational Formats







From the right Dr Assous the head of Physics department in SQU, Dr Maya ALAzri Ministry of Education and Undersecretary of the Ministry Education  
Dr Amr Radi & SQU University team in public engagement and student education







Creative workshops



Science Flash Mob



primary school student lectures



Creative workshops



Science workshop



creative teacher workshop





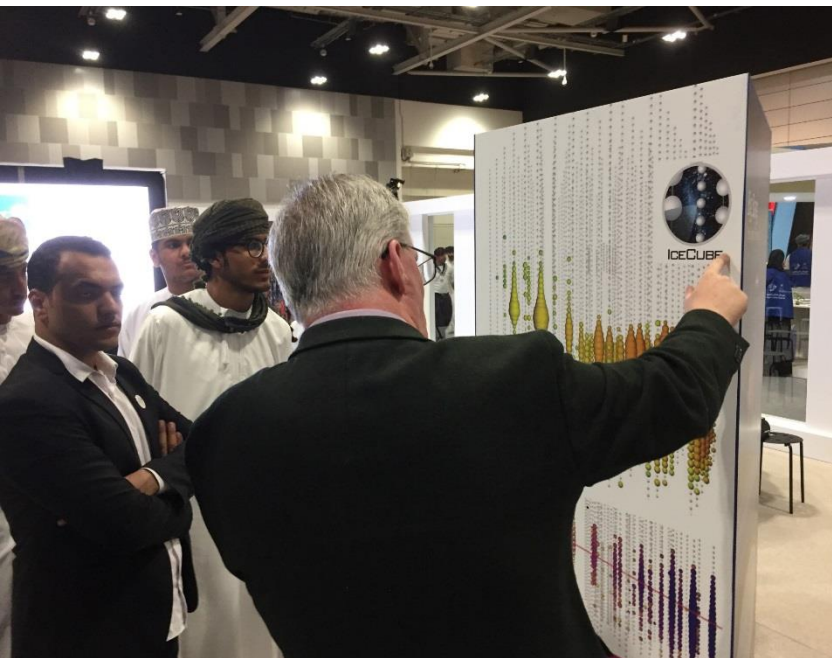
Particle Physics- masterclass  
Neutrino Physics - ICEcube



laser Interferometer WS  
Creative Teacher Workshop



Creative Primary School Students  
CERN Virtual Visit







education material



LHC photo wall



education material



education material



space time distortion workshop



detector hardware on display





Lectures by local scientists from SQU



children workshops



astrophysics

introduction



Public engagement by local SQU University staff



# “Art&Science” Balloon Museum Chateau d’Oex/ CH

April 2019 – March 2021 by art@CMS/ ORIGIN

In collaboration with University Bern, University Fribourg, CHIP, HFSJG, CMS, ATLAS

Cross disciplinary exhibition on Cosmic Ray Discovery with Balloons, lectures , Junior Scientist booklet, various science & creative lecture and workshops during Balloon Festival January 25<sup>th</sup> – February 1<sup>st</sup> 2020

**ART & SCIENCE**  
du 4 mai 2019 au 31 mars 2020

espace **BALLON**  
CHÂTEAU-D'OEX

ÉVEILLER LA CURIOSITÉ

2 chemin des Ballons - CH - 1660 Chateau-d'Oex www.espace-ballon.ch +41 78 723 78 33

## Pioneers of Cosmic Rays

## Entdecker der kosmischen Strahlung

## Pionniers des rayons cosmiques

**Albert Gockel 1860 - 1927**  
Professor at University of Fribourg (CH)

**Victor Hess - 1883 - 1964**  
Nobel Prize 1936  
Austrian Academy of Science Vienna, later Professor at Universities of Graz (A) and Innsbruck (A)

**Werner Kohlhörster 1887 - 1946**  
Nobel Prize 1936  
Professor at the Physics Academy of Sciences

**Ionisation increases with altitude**

**ISS - AMS experiment 400 000m, 2011 - ongoing**

**Bertrand Piccard World Tour 11 700m**

**Werner Kohlhörster 9300m 1914**

**Victor Hess 5300m 1911**

**Albert Gockel 4500m 1909**

**Eiger Mönch Jungfrau 4158m**

**Jungfraujoch 3500m Sphinx Observatory 1931**

**IceCube South Pole - 2450m, 2005 - ongoing**

**Super Kamiokande (J) -1000m, 1996 - ongoing**

**Pierre Auger Observatory (RA) 1400m, 2004 - ongoing**

**MAGIC, La Palma (E) 2200m, 2004 - ongoing**

weather balloon 30 000m

Air plane traveling altitude 10 000m

Electrometer around 1909



# “Art&Science” Balloon Museum Chateau d’Oex/ CH

## Through the opening of the exhibition:

Guided tours

lectures

Junior Scientist booklet





# 42e Festival International de Ballons 25<sup>th</sup> January – 2<sup>nd</sup> February

Scientific Contributions by Swiss and ORIGIN partners to the festival:

25<sup>th</sup> January Saturday Opening Day

- Historic Balloon flight up to 6000m altitude with real Cosmic Ray measurement – University Fribourg
- Lecture and Workshop program from 11h30 till 19h
- key note presentation during the opening

26<sup>th</sup> January Sunday

- Lecture and Workshop program from 11h30 till 19h

29<sup>th</sup> January Wednesday – Children Day

- Lecture and Workshop program from 11h30 till 19h

1<sup>th</sup> February Saturday

- Lecture and Workshop program from 11h30 till 19h

2<sup>nd</sup> February Sunday Closing Day

- Lecture and Workshop program from 11h30 till 19h



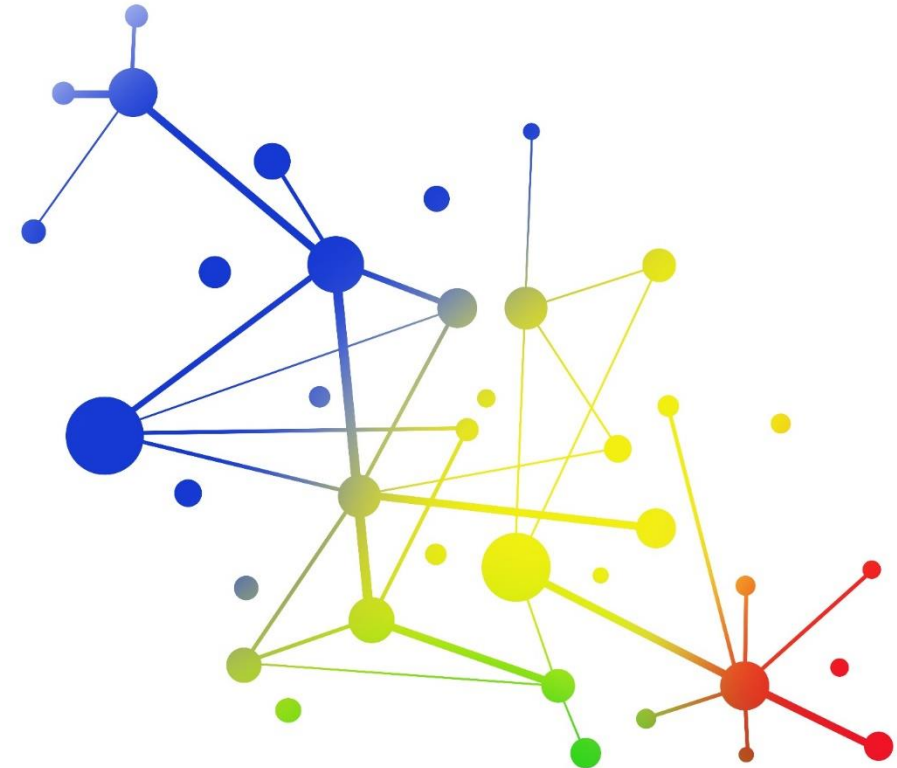
Avec le soutien des Communes de Château-d'Ex,  
Rossinière, Rougemont et Saanen, de Pays-d'Enhaut Région et de la Loterie Romande



# Collaborations Art Universities

Collaborations recent years:

2014 2016	Chelsea College of Arts London, UK
2016 2019	Central Saint Martins College of Arts London, UK
2016 2018	Applied Art University Vienna, AT
2017 2018	Ecole Superieur d'Arts Lille, FR
2018 2019	Art University Montenegro, ME
2017 2019	KASK, Ghent, BE





# University of the Arts London -Saint Martins College of Art

local scientific partner: Imperial College

2 semester sciART course October 2016 – June 2017

- 22 students supervised

Responsible: Prof. Nathan Cohen, Prof. Heather Barnett, Dr. Andrew Charalambous

- Weekly lectures at the UAL/CSM
  - Lectures from colleagues of Imperial College
  - Visit at CERN 5 days December 5 days May
  - Offered workshops at CERN during May visit
  - Final show in London June and November

Photos: <https://goo.gl/photos/VfSSqkg7cN7Ejzs97>

## ARTISTS PRESENTATION EVENING

Central Saint Martins MA Art & Science students (London) present a

### PechaKucha Night

Tuesday 9 May  
drop in from 5pm

Restaurant 1, next to the glas box



## PHOTOGRAPHY WORKSHOPS

with Central Saint Martins MA Art & Science (London) students at CERN this Wednesday – FREE

Wed 10 May 10.30–12.30pm UP TO 12 PEOPLE  
Pinhole Camera Workshop  
with Olga Suchanova

In this workshop, you will learn how to make a pinhole camera in a 30-minute demonstration using a special edition beer can designed and sold by Tate Modern and the basis of Olga's camera. We will take photographs with this device and develop them in a DIY darkroom. Also, you can become part of the project 'Chasing the Sun' and learn how to take Solargraphs. All materials provided.

To register, email Olga at [olga.suchanova@hotmail.com](mailto:olga.suchanova@hotmail.com)  
Meeting point Bldg 40 coffee area CMS side 10:25



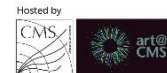
Wed 10 May 2.30–3.30pm UP TO 12 PEOPLE  
Solar Prints–Cyanotype Workshop  
with Lisa Pettibone

This workshop will use the sun's ultra-violet rays to interact with ferric-based chemicals on paper, creating beautiful images called cyanotypes, an early photographic process used by Sir John Herschel in 1842. We will make contact prints using objects arranged on pre-coated paper and placed in the sun. Mysterious shapes emerge from an intense blue background. Please bring several objects to use, other materials are provided.

To register email Lisa at [lpettibone@btinternet.com](mailto:lpettibone@btinternet.com)  
Meeting point Bldg 40 coffee area CMS side 14:25



for any further questions please contact Michael.Hoch@cern.ch  
CERN phone 16 5720



10AM - 6PM  
14 JUNE - 17 JUNE  
**CSM x CMS:  
ENTANGLED**  
FOUR CORNERS GALLERY  
121 ROMAN ROAD E2 0QN  
BETHNAL GREEN - LONDON  
- PRIVATE VIEW -  
6PM - 8:30PM  
THURS 15 JUNE

Twenty artists from Central Saint Martins' MA Art & Science respond to their visit to the CMS particle detector and CERN facilities near Geneva, in a stimulating student-led exhibition including sculpture, video, printmaking and photography.

facebook.com/entangledcsmcms

fourcorners CMS art@CMS ual: central saint martins

design by Victoria Westerman



# University of the Arts London - Saint Martins College of Art

local scientific partner: Imperial College

Vernissage / Exhibitions: June (Labyrinth) November (CSM) 2017

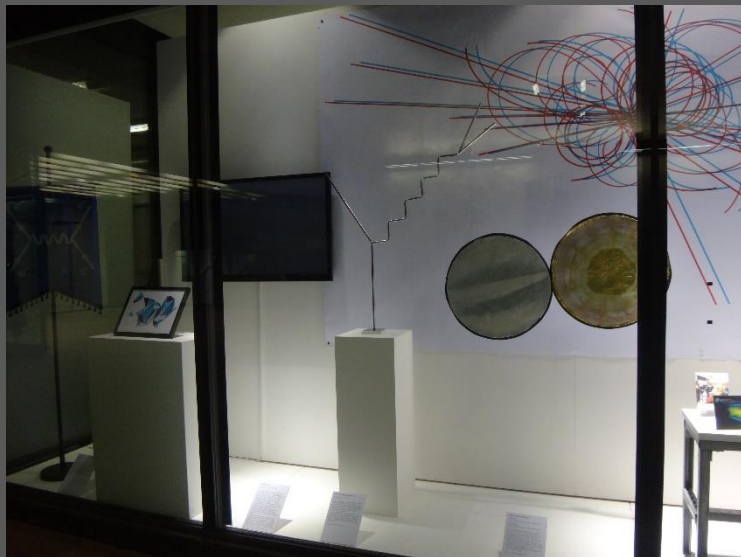




# University of the Arts London -Saint Martins College of Art

local scientific partner: Imperial College

Windows Gallery Exhibition CSM –Nov 2017 Jan 2018 – Symposium November 24<sup>th</sup>





# Applied Arts University Vienna

local scientific partner: HEPHY

2 semester sciART course October 2016 – June 2017

- 2 classes each 11 students + 11 staff  
*responsible: Prof. Virgil Vidrich, Prof Paul Petritsch*
- Weekly lectures at the Applied Arts University
  - Visit & Lectures from colleagues of HEPHY & TU
  - Visit at CERN 5 days December
  - Artwork rehearsal March
  - Particle detector construction workshop March
  - Final show in Vienna June

Photos : <https://goo.gl/photos/i6MqYfwCRgnNVs4N9>

**Opening**  
June 6th 2017, 19:00

**Accompanying Program**  
June 9th 2017

**das weisse haus**  
Hegelgasse 14  
1010 Vienna

**EXHIBITION**  
JUNE 7th-17th 2017

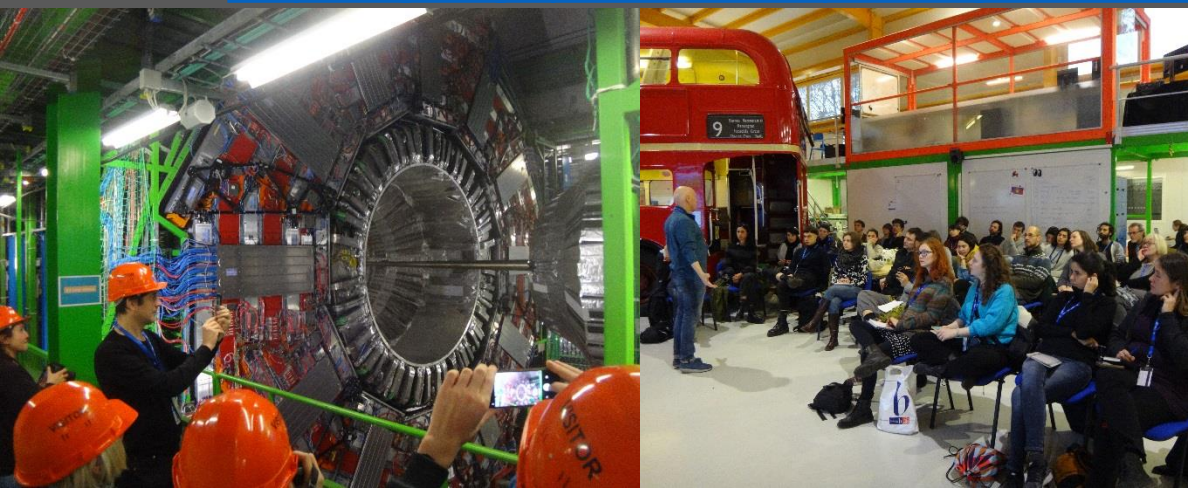
**CIRCUIT TRAINING**

**A FORAY INTO THE WORLD OF THE LARGE HADRON COLLIDER**

A project from students of the University of Applied Arts Vienna (Art@Science and Site Specific Art) in cooperation with CERN (Art@CMS and HEPHY)

Artists listed around the question mark:  
Natalia Goreva, Carmelia Tarilante Rodriguez, Denise Schellmann, Athanasios Gramosis, Lukas Gritzner, Benedikt Melzl, Rosie Beam, Johanna Falkmann, Marko Markovic, Lela Nomada, Marina Rebhandl, Canan Ergin, Andrea Vesgo, Nora Drumeva, Francesca Aldigiani, Daniela Brill, Frederique Neuts Leroy, Rafael Lippuner, Galnaz Bashiri, Julia Mag, Andrea Budak, Daniela Brill, Frederique Neuts Leroy

Logos at the bottom: W, dt:angewandte, HEPHY, art@CMS, CMS

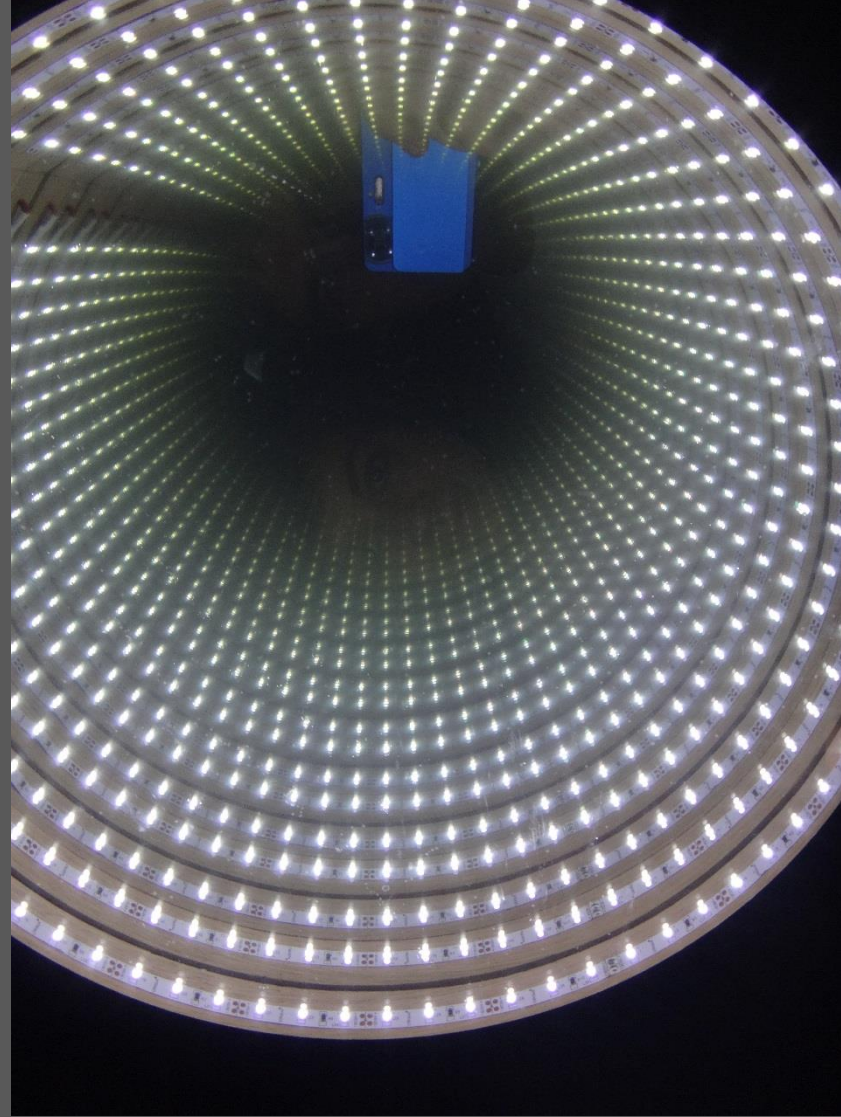




# Applied Arts University Vienna

local scientific partner: HEPHY

Vernissage / Exhibition June 2017





# Chelsea College of Arts London

## 1 semester sciART course October 2014-2015-2016

- supervision Prof. Dave Webster
- Weekly lectures and discussions at UAL
  - 2014/ 2015 Visit at CERN with 4 students + 4 trainees Shoreditch Trust
  - 2015/2016 - Visit at CERN 5 days, Final show TriangleSpace London June



### OUR CONCERN

A collaborative project between the CMS collaboration at CERN, Camberwell, Chelsea and Wimbledon Colleges of Arts (part of UAL), the Shoreditch Trust and Allminds which involved recent Fine Art graduates from Wimbledon College of Arts and young people from the Shoreditch Trust Active Citizens programme visiting the CERN laboratory.

**Friday 28th Nov 2014**  
 Private View : 9 - 8pm  
 Restaurant Exhibition:  
 • Performances  
 • Food and drinks (canapes)

**\*Saturday 29th Nov to 9th Jan 2015**  
 Restaurant Exhibition

Waterhouse, 10 Orsman Rd  
 London N1 5QJ

\*Please note Waterhouse will be closed for the holidays from Dec 25th - Jan 6th



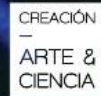
South America, Bogota/ Colombia  
December 2018 – April 2020

**“SURATOMICA”** cross-disciplinary science engagement & networking  
with Colombian artists and Colombian school in dialogue with our  
ORIGIN partners in Colombia and at CERN.

Supported by\_



IdeaS



CONTACT

Daniela Brill - Wien, Austria.  
+43 677 61297012  
suratomica@gmail.com

FIRST  
CREATION SPACE  
BY SURATÓMICA  
AT CERN

Images: Reverberations of a Topological Daydream. Artist Santiago Tavera. Pix Abraham Mercado.  
/ Distiller of the Self. Artist Natalia Rivera / Vi Creation - Art & Science Encounter. Distrito  
Cinematheque. / Poetry in Particle Collisions / Thinking Group Suratómica / CMS Experiment /  
Ideasquare at CERN / ConcueroPmov Collective / Queer Architectures and the Virtual Body  
Workshop. Artist Santiago Tavera. / Colorful Spaces of Transformation. Artist Martin Rora.





# “SURATOMICA” cross disciplinary science engagement & networking with Colombia

## Collaboration schedule 2018/2019:

Nov/2018 – April 2019 project preparation

April 2019 kick off symposium

- selection of artist groups
- each 2 weeks work meetings
- dialogue with ORIGIN partners

Sept/ Oct 2019 working visit CERN 2 weeks

Oct 2019 School visit at CERN 1 week

- Alcaparros school, Bogota

April 2020 science & art festival Bogota

- art exhibition of participating artists
- school students exhibition

Project: <https://mhoch.web.cern.ch/Art@CMS/Suratomica.pdf>

artists @CERN: <https://indico.cern.ch/event/793349/>

project video : <https://youtu.be/E4f85WpEevo>

## Outlook 2020 – 2022:

- Second SURATOMICA Colombia
- first contacts to Mexico, Brazil

04-19\_  
04-20

### Suratómica

Suratomica is a space for creation and collaboration between art and science where artists from the Global South will strengthen their practice through cooperation and encounters with scientists and their environments.

The program enables new ways of dialogue between scientific thinking and artistic knowledge, promoting open access to creation in these fields and aiming to strengthen the reflection from the Global South upon science, development and access to knowledge.

This first edition, which will be held in Bogotá and Geneva, will host Colombian artists at CERN European Organization for Nuclear Research in Switzerland, for a two-week interdisciplinary science program. Likewise, artists and scientists currently associated with CERN will be invited to Colombia.

Organized by:  
Mutante.Lab - Bogota, Colombia  
Cuántico - Wien, Austria  
art@CMS | ORIGIN - Geneva, Switzerland

[www.suratomica.com](http://www.suratomica.com)  
@suratomica

#### CONTEXT



04.19

#### RESIDENCY



09.19

#### FESTIVAL



04.20



Thinking Group

#### RESEARCH

06-08.19



Artworks

#### CREATION

10.19 - 03.20



Workshops

#### PROPAGATION

04.20 +



# Further Collaborations





## Feynman inspired art

a construction manual

Andy Charalambous in collaboration with CERN HST Programme 2017



Fig.1: Coreen, 2012

### 1. Introduction

When I left school I went to work as a technician for the Physics and Astronomy department at a university in London. I trained as an engineer and spent many years designing and building equipment for the research groups there. My interest in science grew as I worked with these groups and got a better understanding of the science they were researching. I loved my job because it gave me so much insight into the science involved.

When I left that job and started as an artist I found that the excitement of science was something I didn't want to move away from. So, I decided to use science as the inspiration for my art. Most of the art I make comes from some bit of science that has seeded an idea. Science is a tool for letting us see our world more clearly, and for me it also inspires my work. By the way, I have not moved very far from the university I worked at. I am Artist in Residence for the Astronomy group and the High Energy Physics groups there, as well as being part of the art@CMS project run by Michael Hoch at CERN.

# sciARTbooklet

## a manual for an art and a science teacher to re- create and create topical artworks

### art@CMS 2017

UK collaborative artists :  
Rachael Nee , Andy Charalambous

in preparation:  
"data sonification" by Federico IT,  
"particle detection" by Ch. Henschke AU

## Orders of Magnitude – Potato Powered Cosmos

a construction manual

Rachael Nee in collaboration with HST Programme 2017



### 1. Introduction

This booklet is written for science and art teachers with the aim of interdisciplinary learning. It assumes no knowledge of the other disciplines subject. In it you will read about the art installation from both the science and art viewpoints and how to reconstruct it. This becomes a jumping off point for the development of new artworks by High School students, with questions along the way.

Science and contemporary art have different end goals; however, they also have a lot in common. Both contemporary art and science have similar methodologies involving; investigation, research, testing out of ideas and theories through experiment. They share imagination, curiosity, quest for knowledge and are forms of inquiry. When successful both allow the world to be seen in new ways.







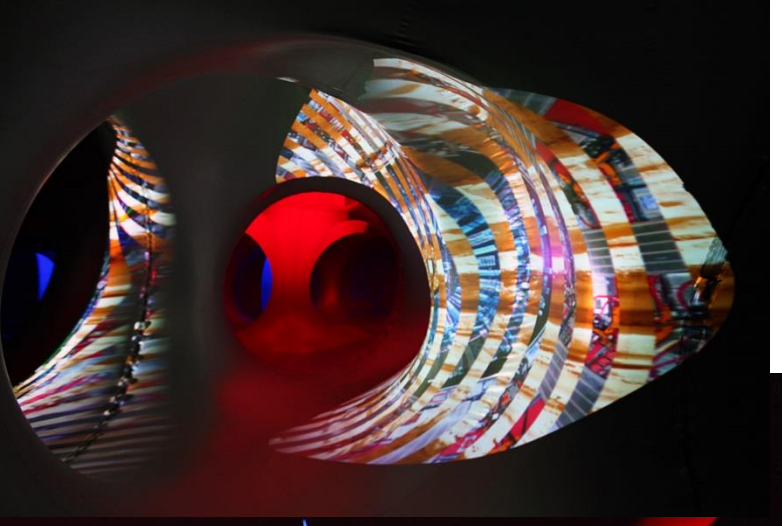
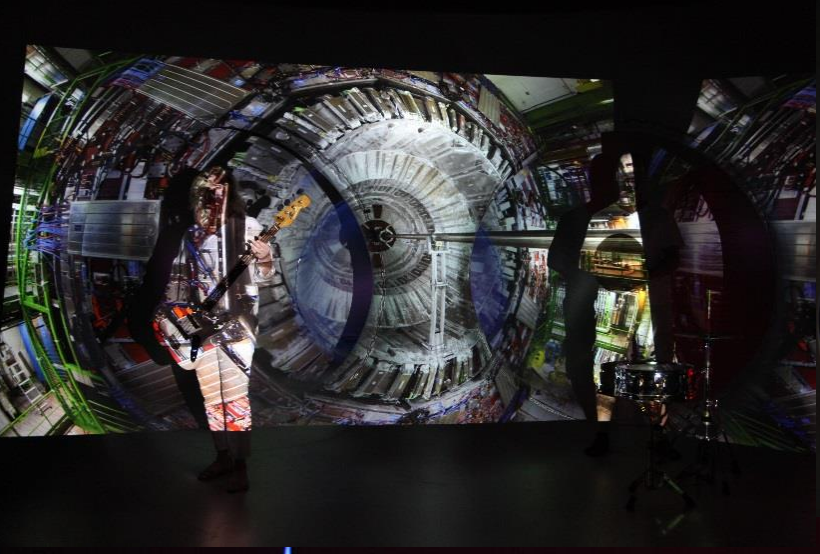
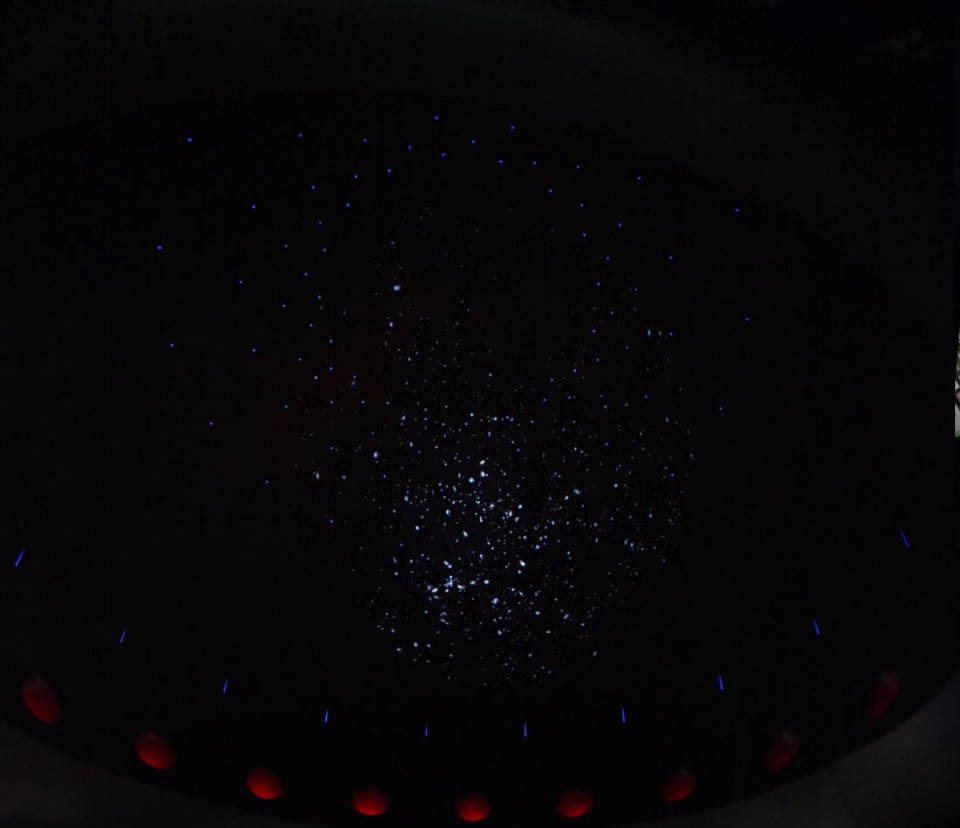
art@CMS  
&  
Architects of Air

is a synthesis of 2  
unique partners whose  
core activity address the  
wonder of light and the  
wonder of the universe.

Combining the  
imageries of the  
machinery of CERN  
with the curvilinear  
environment of the  
Architects of Air dome  
creates an incredibly  
intriguing layer of  
visual experience.

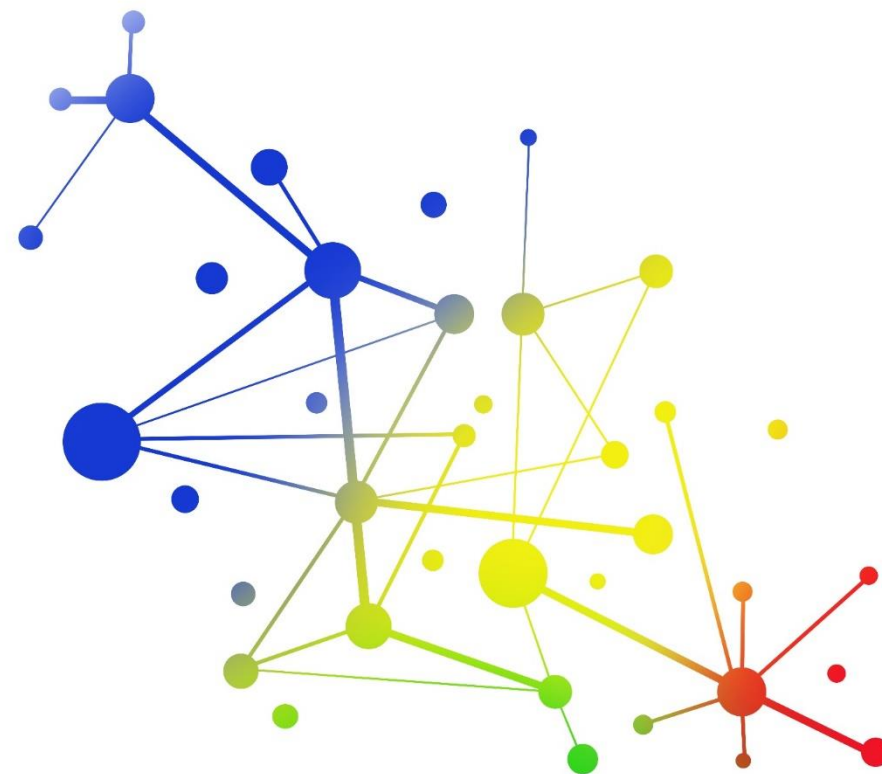




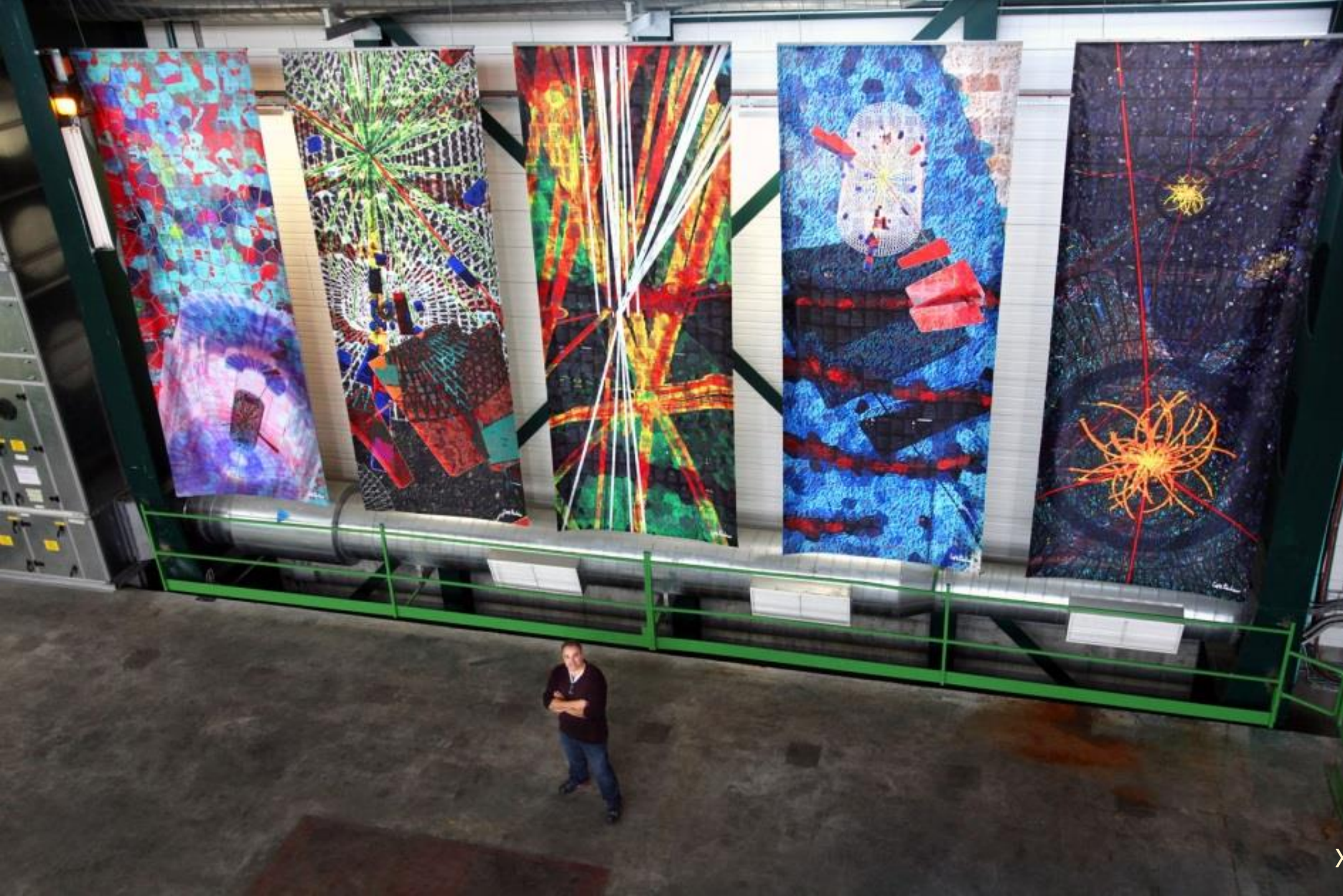




# Collaborations with Artists



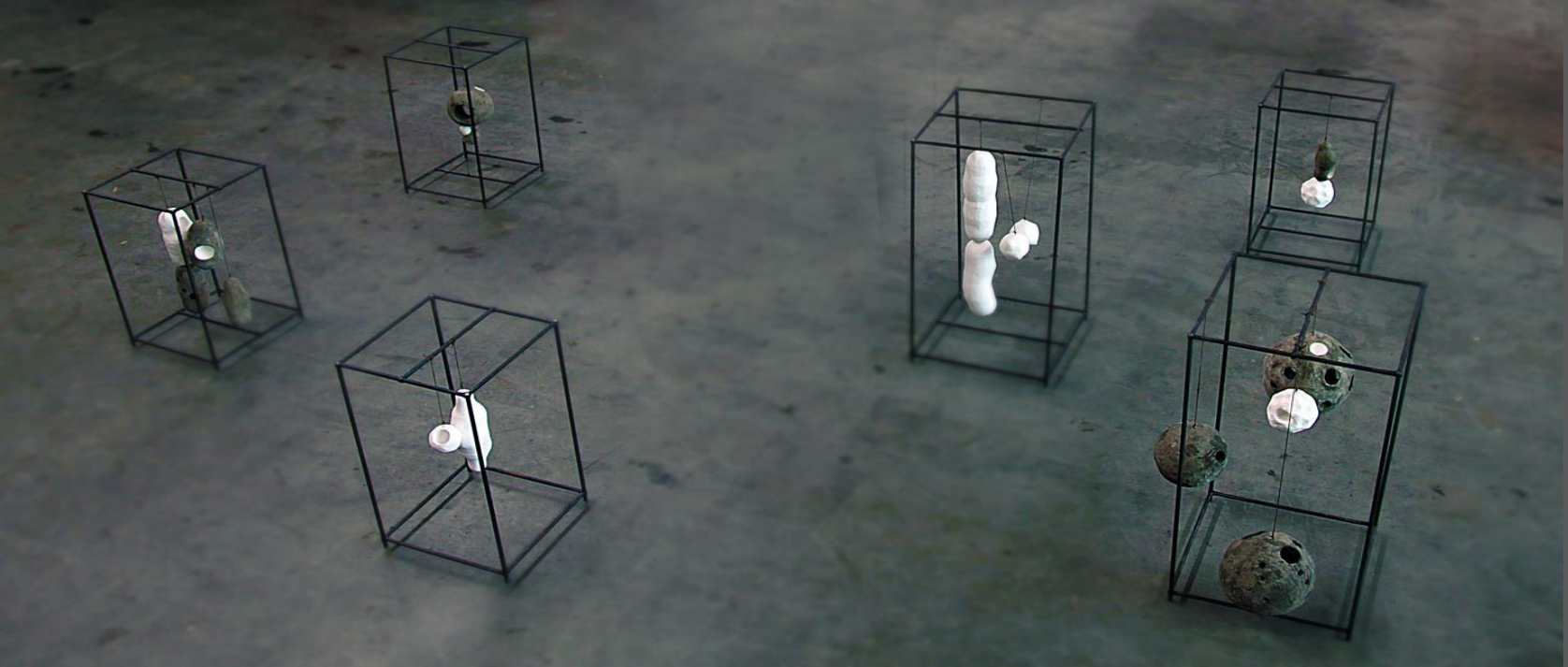






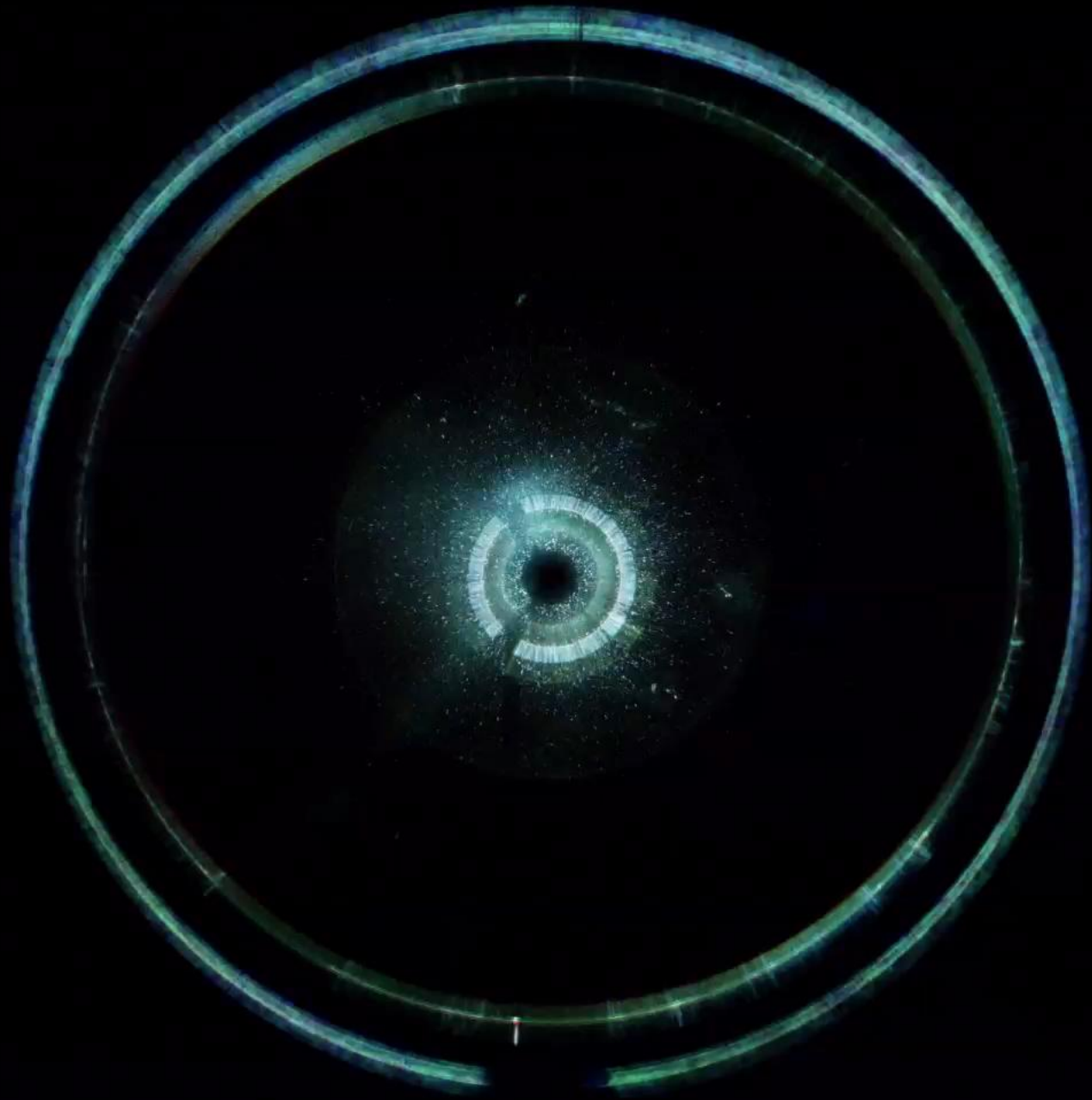






Alison Gill / UK







# art@CMS: collaborative artist CONSENSUS

CONSENSUS participates as well in science & art workshops



## *UK Rapper launches album **CONCERNED***

*after 2 years of collaboration his science rap album ConCERNed.*

CERN Article (all info): <http://cms.cern/news/concerned-using-his-hsp-engage-new-audiences-particle-physics>

FERMILAB talk: <http://events.fnl.gov/acts-lecture-series/events/event/rapper-consensus-free-lecture-demonstration/>

## *More Infor & Links:*

Interview on the Financial Times 2018 : <https://www.ft.com/content/b4ed4d8-d940-11e8-aa22-36539487e3d0>

BBC interview 2018 : <https://www.bbc.co.uk/sounds/play/p06qfhr5>

The BBC interview of ConSensus and Sudan 2017 [the sequence starts at 1:11.18 until 1h26.26]

- <http://www.bbc.co.uk/programmes/b04xvq0f#play> <https://www.youtube.com/watch?v=M1toBq2VTNc>

Press article in the journal "The Voice" and "ProBeta magazine" 2017 :

- <http://www.voice-online.co.uk/article/south-london-geneva-hip-hop-science-lessons>
- <http://www.probetamagazine.com/en/typical-collisions-rap-meets-particle-physics>

## Music videos of his 9 tracks album "conCERNed" on youtube :

- Method to the Madness <https://www.youtube.com/watch?v=13B-Az4Bg&feature=youtu.be>
- CMS [Grim Music] <https://www.youtube.com/watch?v=1ju3fo37yLE&feature=youtu.be>
- Antimatter <https://www.youtube.com/watch?v=2Uun9Cfq-1A>
- Dark Matter <https://www.youtube.com/watch?v=0keA2eP1G08>

- Science Rap videos by students after his StudentsRapWorkshop 2016 "Particle Love": <https://youtu.be/5d829vd3U18>











To have a broader reach in society, to inspire public and especially the next generation with science methodology and science topics or the importance of science for humanity we need to diversify our 'languages' to communicate.

**Cross-Disciplinary Engagement & Networking  
is a very powerful way to make allies with  
other creative communities**

Thank you for your attention!

[Michael.Hoch@cern.ch](mailto:Michael.Hoch@cern.ch)

phone: +41 754115720

**art@CMS/ORIGIN** program leader

Visiting Professor FSU Tallahassee, US

