

International Particle Physics Outreach Group

WG on Applications for Society 7th Meeting

6 May 2022

Collection of success stories



Reminder from
February 2021

NEW WORKING PLAN

1) COLLECT: all existing stories, which are scattered in many places

Short-term plan

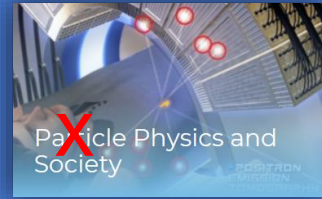
EXAMPLE: Story on solar panels technology from ultrahigh vacuum in [Symmetry magazine](#)

2) WRITE new ones, which do not exist in short story form yet, perhaps create videos / interviews...

Long-term plan

3) EXPAND scope to beyond CERN / PP - heavy ions, astro-PP and cosmic rays, gravitational waves, thermonuclear fusion etc...

4) DISSEMINATE – through our IPPOG RDB “~~X~~PP and Society” in RDB



5) PUBLISH

PRIORITY 2022: COLLECTION OF SUCCESS STORIES

Collect the content from different places:

- the collection of materials on WG's google doc (see next slide)
- CERN KT, Accelerating news
- Other particle physics and related sciences labs, e.g. GSI
- Other Big Science Labs, e.g. EMBL, ITER / Fusion4Energy, ESA...

The collection of success stories “Benefits of fundamental research for society”

- ❖ First WG's deliverable to be published on the new IPPOG website
- ❖ IPPOG's contribution to UNESCO International Year of Basic Sciences to Sustainable Development

Collected materials / stories on impact on society

IPPOG Application Stories

- Sign up for the topic where you want to contribute
- Propose new topics

TOPIC	RESOURCES	COMMENT	PERSON	STATUS
All applications	General resources			
Medical applications	General medical applications resources			
PET	Material from Martin Wensveen (CERN) here -Interview to be done later; -Maybe include CAEN PET scanner kit -Presentation by Despina 29 Nov 2019 here	PET using new type of dense scintillating crystals; CERN has pioneer contribution to forerunner of PET	Yiota Despina Andrej	Draft
RMI		PET and MRI imaging combined in single device thanks to new generation of CERN detectors		
Hadron therapy	Material from Hans Specht (GSI) here + interview to be done later More materials here	Treating tumours with beams of protons and light ions reducing the radiation exposure of healthy tissue (3 HT centres in Europe built in collaboration with CERN. CERN supports development of miniature linear accelerators for proton therapy). Kraft (presentation)	Katharina Bulatovic	HT story
Precise dose calculations based on particles simulations		Software for simulating particles interactions in detectors - used to calculate precise radiation dose for cancer treatment - space applications		
MEDIPIX	Info here	medical diagnostics, industrial processes, X-ray based material analysis, X-rays by detectors invented by Charles in 1958 need fraction of dose required by photographic methods, International Space Station	Yiota	

MEDICIS (Radioisotopes treatment and diagnosis)			Barbora	
Other applications	General resources			
WWW	Text for article for slovak newspaper in Slovak language, Barbora Bruant Gulejova here	Invention at CERN (1993) driven by need of better communication of scientist worldwide, had a huge impact # of internet users from 14 millions to 3.2 billions from 1993 till 2015- contribution to 2.9% of world global GDP - 1672 billion US\$ (in 2011)	Barbora Teddy	
Touchscreen	Article here	CERN was pioneer in breakthrough technologies, such as touchscreen for SPS in 1973	Thomas	
Solar cells technology	Article in symmetry here	Benvenuti working at CERN, inspiration for solar cells technology based on ultra high vacuum - GVA airport, KT case, cautious as it went bankrupt	Barbora	
TERABEE		sensor technology used in drones to explore places with difficult access	Teddy	
INVENIO		digital library and document repository used by providing cloud based digital library system for UN		
CLOUD	Link 1 Link 2 Link 3 Link 4 Link 5 Link 6	exploring the influence of cosmic rays on cloud formation in the Earth's atmosphere giving important input to global climate models	Katharina	
Radiation protection		Dosimeters and other applications		

UNOSAT	Notes from BBG here	In cooperation with UN, CERN provides the IT infrastructure to UNOSAT programme of UN/TAR hosted at CERN, to be at the forefront of satellite analysis technology -15 years of humanitarian mapping: disaster risk reduction, regional capacity development, - damage assessment, climate services, water and food security	Barbora	
Superconductivity	Link 1 Link 2 Link 3 Link 4 Link 5 Renewable and sustainable Volume 55, March 2016, Pages 59-72	Potential use for energy transport	Katharina	
Rolex antimagnetic watch	See link		Barbora Teddy	
Cultural heritage	Muon tomography,....		Despina Katia	
Accelerators for society	Medication, Sterilisation, Water purification... "Accelerators on ships" from "ARIES Accelerating News" See here		Yiota	
Detectors in industry				
WIFI	See here	Search for Hawking radiation	Jonivar	
GPS and Einstein Theories			Lorenzo	GPS story
GPS	GNSS Masterclass GNSS links	Example of simple GPS based masterclass for EEE high school students	Marina Trimarchi for EEE collaboration	

Hyperloop	link	Possible traveling of future	Lorenzo
CAEN	Interview with Gianni (CAEN), more materials will be sent	Examples of their technologies used in industrial applications	Barbora
CERN against COVID	Presentation from James Gillies at IPPOG here CERN against COVID19 seminar here Website CERN against COVID TF here		
LIP and COVID	Ricardo's presentation at IPPOG here		
Science response to COVID	Presentation from Savannah at IPPOG here Initiative "science responds" here		
Physics in the service of archeology	https://indico.cern.ch/event/942612/contributions/3962145/attachments/2082233/3497568/Alfaro.pdf		Jose Ruben Alfaro Molina
Tesla	https://indico.cern.ch/event/942612/contributions/3960794/attachments/2082036/3497226/YF-TESLA-IPPOG-WG-29jul2020.pdf		Yiota
ATTRACT highlights	https://attract.eu.com/news-and-events/		Barbora

And more...

WORKING PLAN: COLLECTION OF SUCCESS STORIES

- ❖ Format / metadata type, Categories:
- Google sheet to collect the coherent metadata

Collection of success stories

IPPOG WG Applications for Society

COLLECTION OF SUCCESS STORIES

All of metadata

Number	Category	Title	Link	Short description	Publisher (optional)	Academic partner (optional)	Industry partner (optional)	IMAGE
1	MEDICAL	CERN scientists develop a ventilator	https://www.cern.ch/en/press/2020/04/20200420-ventilator	First COVID-19 ventilator developed by CERN scientists. Combining radiation therapy and diagnostic tools into one device. The research is the technical innovation that physicians can't find elsewhere. CERN's expertise in the development of the COVID-19 pandemic. The ventilator was developed in record time that could help in the future against any disease the COVID-19 pandemic is countered with a precision medical infrastructure.	CHFP	CHUK, CERN University of Bern	Novartis La Tour du Tige and Swiss Lausanne and Geneva University hospitals	
2		Drugs from the particle physics research	https://www.cern.ch/en/press/2020/04/20200420-drugs	CERN MEDICS manufactures isotopes for medical purposes. CERN in Geneva is the world's largest facility for the study of subatomic particles. The research that leads to new science can sometimes be used for practical purposes too. CERN is exploring the use for the particles emerging from the Proton Synchrotron Booster (PSB). They are used in the large particle accelerator LHC for scientific experiments. The particles can also be used to produce isotopes that are used in radiation medicine. Such isotopes are produced in the specially adapted facility, CERN-MEDICS.	CHFP	CERN-MEDICS		
3								
4								
5	SPACE							
6								
7	ENGINEERING							
8								
9								
10	COMPUTING - hardware							
11								
12								
13	COMPUTING - software							
14								
15								
16	ENVIRONMENT							
17								
18	CITIZEN SCIENCE	Particle Physics for everyone	https://www.cern.ch/en/press/2020/04/20200420-citizen-science	The European Research Centre for Particle Physics (CERN) is looking for citizens willing to share the measurement data from their large scale experiments available to the public. The aim is to provide a platform for citizens to share their data with the public and to identify high school students - for example in Switzerland.	CHFP	CERN, CHUK, ALCU, AUCU		
19	SOCIETY	Article: View on Physics	https://www.cern.ch/en/press/2020/04/20200420-view-on-physics	The International Program on @ CERN is Five Years Old	CHFP	INTGEM		
20		Research as a peace project	https://www.cern.ch/en/press/2020/04/20200420-research-as-a-peace-project	Research synchronization in Jordan needs to start. The line of action physics enjoy reported in peace and war, but the line can't be explored or their applications. Conflicts must be used as a solution. Physics is a peace project. With the research project, the challenge. Against the background, there is a lot of hope for the future. The research in the Middle East for the production of high-intensity X-ray radiation. CERN-BESAME will be launched during summer 2021.	CHFP	BESAME, FB		
21								
22								

Propose new category

Thanks, Katharina for help!



Category	Image	Title + Link	Publisher	Academic Partner	Industry Partner
MEDICAL APPLICATIONS		Hadron therapy for cancer	CERN KT	CERN	CHUV
		PET scanner	CERN KT	CERN	
COMPUTING TECHNOLOGIES		World Wide Web story	CERN KT	CERN / MIT	

WORKING PLAN: COLLECTION OF SUCCESS STORIES

- ❖ Create the dedicated website as part of new IPPOG webpage:



<https://test-ippog-d8-clean.web.cern.ch>

International Particle Physics Outreach Group

About Resources Activities News

Benefits of fundamental research for society

Collection of success stories

Medical Space Computing hardware Computing software Engineering Environment Citizen Science

	TITLE	PUBLISHER	ACADEMIC PARTNER	INDUSTRY PARTNER
MEDICAL APPLICATIONS	Title of topic	CERN KT	CERN	CHUV
	Title of topic	CERN KT	CERN	CHUV
	Title of topic	CERN KT	CERN	CHUV

- ❖ Also part of IPPOG RDB

International Particle Physics Outreach Group

About Resources Activities News Events For IPPOGers

IPPOG Resource Database

From wonders to excitement

A collection of high quality engaging materials e.g. videos, posters, talks, hands-on activities and more to help you share the wonders and excitement of particle physics with teachers, students and the general public. At the bottom of this page you'll find also the collection of webpages of IPPOG members containing resources in their national languages.

Please, note, that the DATABASE IS UNDER DEVELOPMENT and the resources are not yet updated to this website. Only few resources are available here for the illustration of the functionality.

[Matter, Particles and the Universe \(Known Physics\)](#)
[Exploring the Unknown \(Beyond Known Physics\)](#)
[Technologies and Experiments](#)
[Particle Physics and Society](#)

CALL FOR VOLUNTEERS

- ❖ Help to collect and fill the metadata to google sheet

AIM:

- Metadata directly filled to the new website
- 1-2 people per category
- 1-2 people per resource website / institute

THANK YOU