International Particle
Physics Outreach Group

# International Particle Physics Outreach Group

## Introduction & Dark Matter Masterclass

**Steven Goldfarb**, *IPPOG Chair*

Presented on behalf of the IPPOG Collaboration, iDMEu, 12 May 2021

# Education, Outreach & Communication

## Communication

- **Report Goals and Results** to the public
- **Extend Reach** through methods & networks

## Education & Outreach

- **Establish Understanding** of scientific process
- **Instil Appreciation** of fundamental research
- **Build Trust** with communities
- **Train Next Generation** of scientists

Education, Outreach and Communication are **Strategic Pillars** of Research
They are what we have to do **before** we build, not just after!

# IPPOG

## International Scientific Collaboration

- Active Researchers with Experience in Education & Outreach
- Experts in Communication & Education

## Global Network

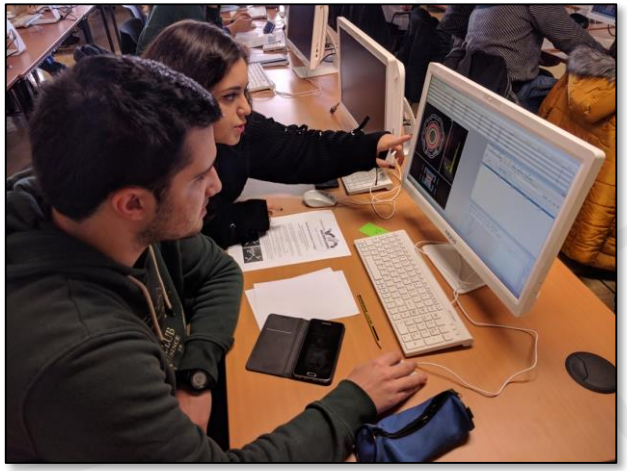
- 37 members: 30 countries, 6 experiments, 1 intl lab (CERN)
- 2 associate members: 2 national labs (DESY, GSI)

## Organise Global Activities

- International Particle Physics Masterclasses
- World-Wide Data Day, Global Cosmics, etc.

## Support Local Activities

- Sharing of expertise, best practices, material database
- Resources to support events, kick-start activities

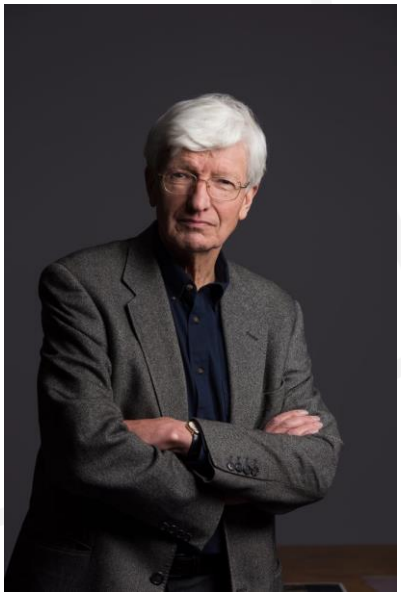


# IPPOG Origins

**1997** Birth of European Particle Physics Outreach Group (EPOG)

**formed under the joint auspices of ECFA and EPS-HEPP**

> *"...the particle physics community has a moral obligation to inform the public on its activities. To do this well, experiences must be shared among countries in view of the need to optimize the use of resources."*
>
> - Chris Llewellyn-Smith, CERN DG

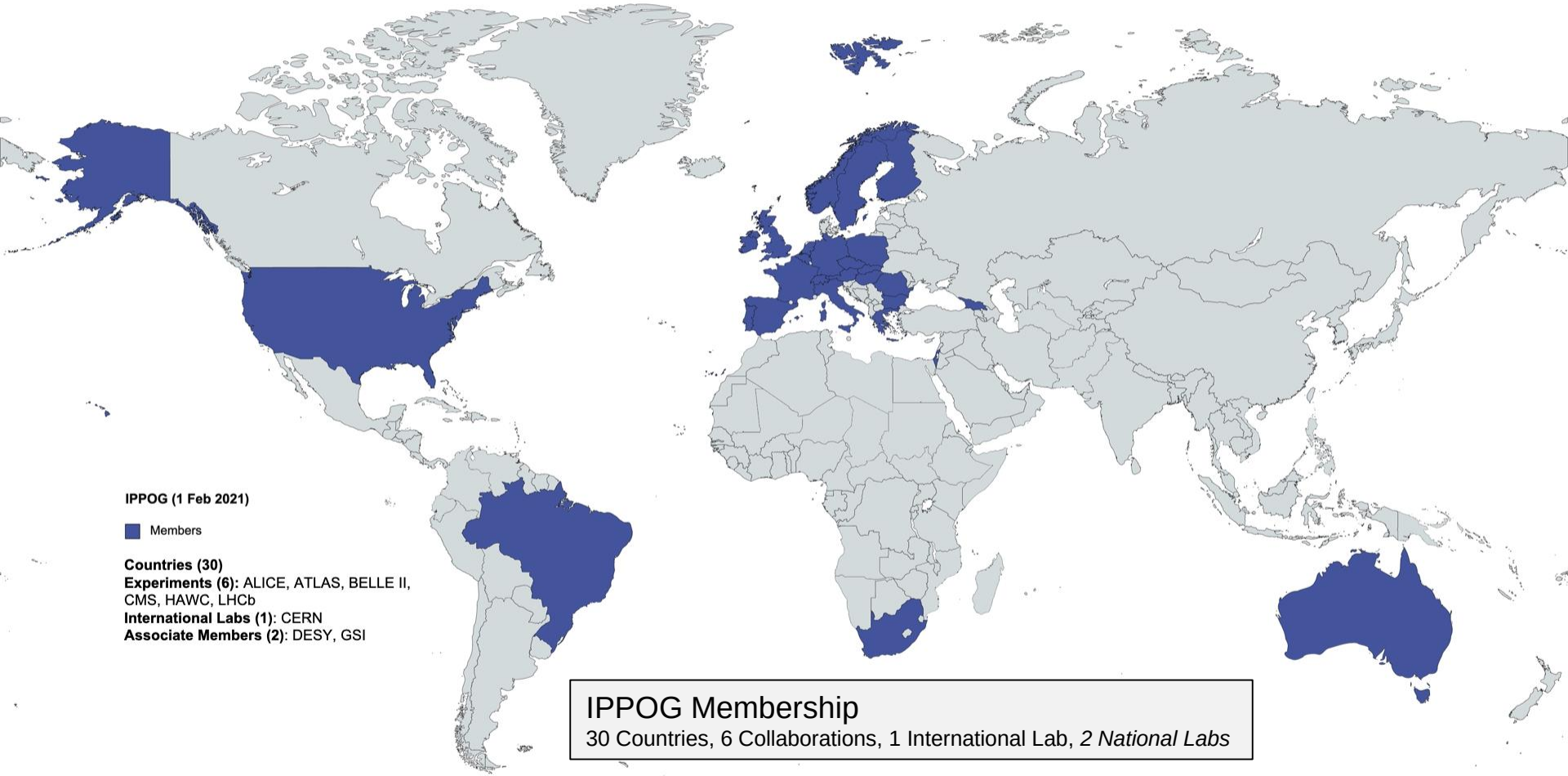


**2011** Global Expansion to IPPOG

**Israel, Australia, USA (now South Africa, Brazil,…)**

**2016** Formal Scientific Collaboration

**Memorandum of Understanding**




# IPPOG Membership

30 Countries, 6 Collaborations, 1 International Lab, *2 National Labs*

# Organisation

## Chairs

- Steven Goldfarb (University of Melbourne) 2017-2022 (2nd term)
- Pedro Abreu (LIP, IST Universidade de Lisboa) 2020-2022 (1st term)

## Core Team

- **Strategic Development & Communication**: Barbora Gulejova (Universität Bern)
- **Administrative Support**: Anita Bens (CERN)

## Coordination

- **Masterclasses**: Uta Bilow (Dresden University), Ken Cecire (University of Notre Dame)
- **Global Cosmics**: Sabine Hemmer (INFN), Carolin Schwerdt (DESY)

## Organisational Bodies

- **Advisory Boards & Committees**: Finance, Speakers & Publications
- **Steering Groups**: Masterclasses, Global Cosmics, Web Development
- **Working Groups**: Bringing Masterclasses to New Countries, Explaining Particle Physics Hot Topics, Exhibits & Public Events, Outreach of Applications for Society

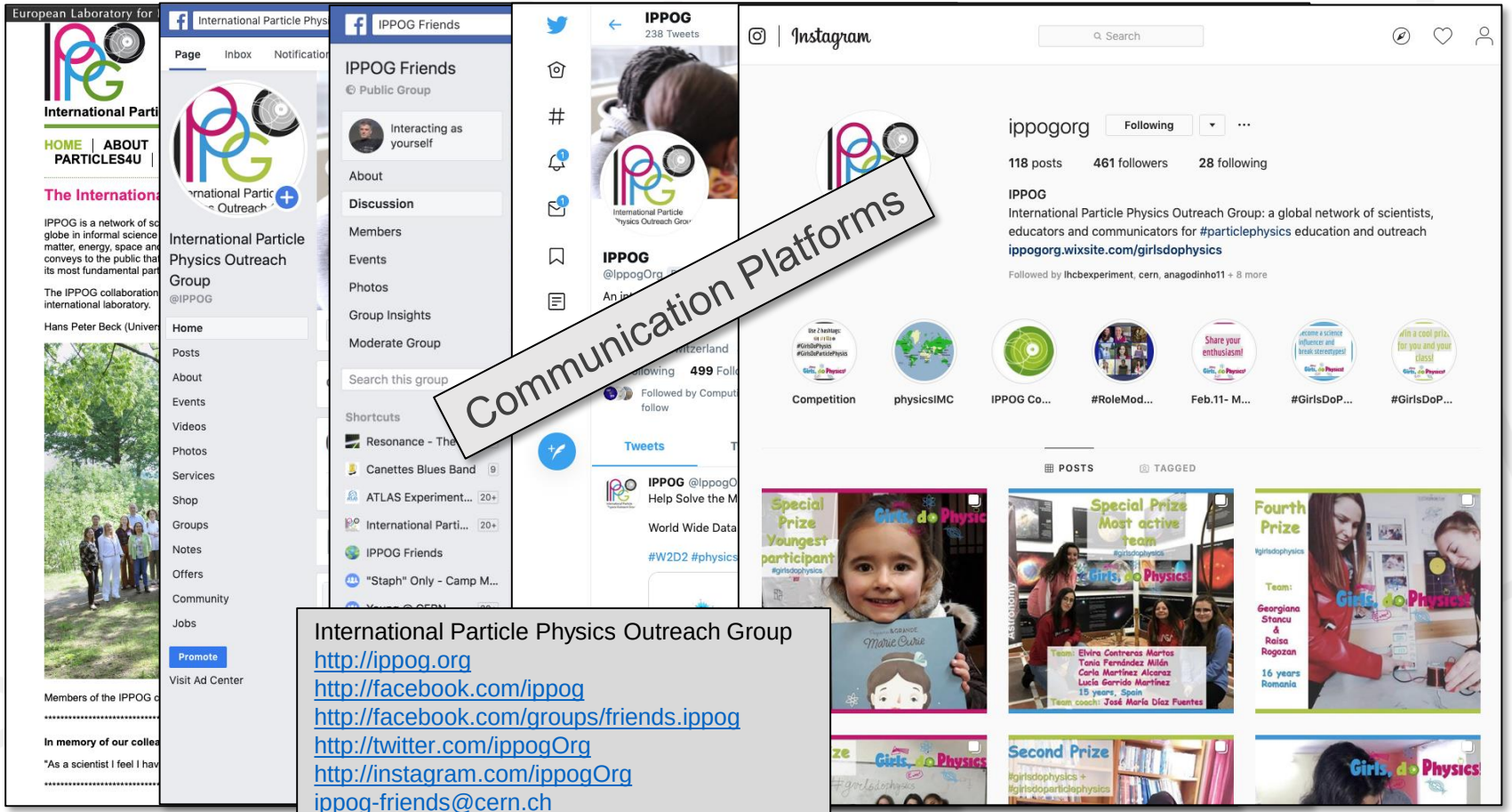
# Sharing Ideas

## 19th IPPOG Meeting

- Online, 7-9 May 2020
- Working Group Meetings & Reports:
  - Exhibits & Public Events
  - Expanding Masterclasses to New Countries
  - Outreach of Applications for Society
- Panel Discussion: “IPPOG, Masterclasses and Formal Education”
  - Educators & Education Specialists
  - Australia, Germany, Greece, USA

## 20th IPPOG Meeting

- Online, 2-4 Dec 2020
- Working Group Meetings & Reports:
  - Expanding Masterclasses to New Countries
  - Exhibits & Public Events
- Panel Discussion: “The next steps following the European Strategy Recommendations”
  - CERN ECO, EPPCN, NuPECC, APPEC, FNAL
- Masterclass Training Sessions


Communication Platforms
International Particle Physics Outreach Group
http://ippog.org
http://facebook.com/ippog
http://facebook.com/groups/friends.ippog
http://twitter.com/ippogOrg
http://instagram.com/ippogOrg
ippog-friends@cern.ch

# International Particle Physics Masterclasses

## The Flagship of IPPOG

- Students become “Researchers for a Day”
- Invited to research institute or university
- Introductory lectures on research
- Use analysis tools to examine real data
- Worldwide videoconference w/other students

## 2019

- 60 countries, 220 labs, **14,000 students**

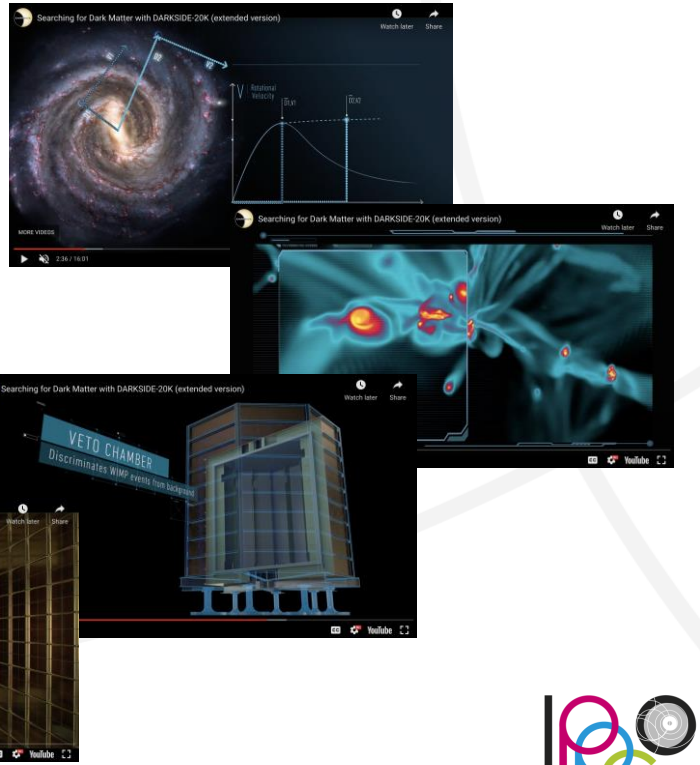
## 2021 (11 Feb – 27 Mar)

- Feb 11 (UN Day Women & Girls in Science): 7 groups
- CERN (LHC): 137 Masterclasses, **5192 students**
- GSI (Particle Therapy): 33 Masterclasses
- KEK (Belle II): 5 Zoom sessions
- FNAL (LHC, Neutrino): 38 Masterclasses, **600 students**

# The IPPOG Darkside Masterclass

## Direct Measurement by the Darkside Experiment

- Created in 2020
  - Darkside researchers, Centro Fermi, IPPOG
- LAr detector in Gran Sasso
- Simple, Excel-based analysis
  - Cuts on timing, energy, fiducial region, etc.
  - Look for DM candidates
- Excellent Introductory Video

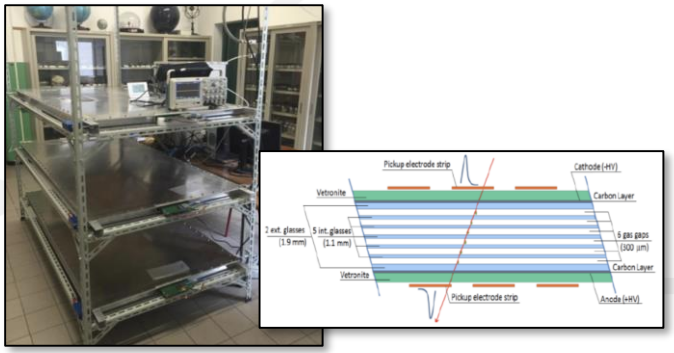


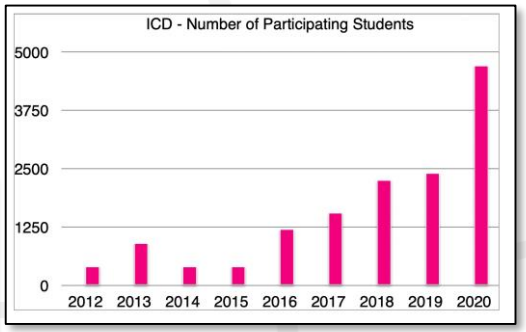
# Global Cosmics

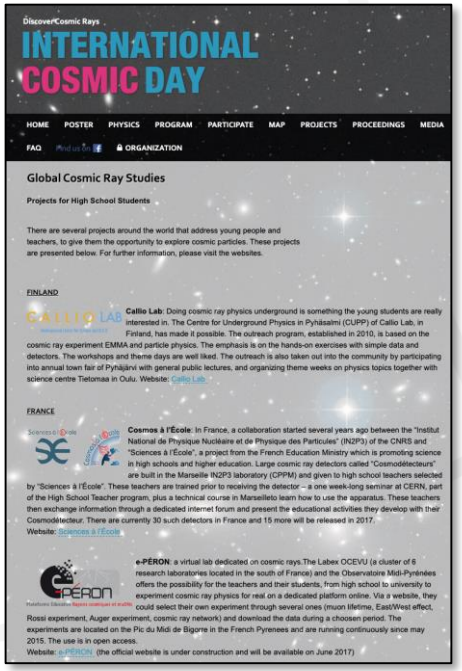
## High School Initiatives Exploring Cosmic Rays

**Sabine Hemmer (INFN), Carolin Schwerdt (DESY)**

- International Muon Week (1-5 Apr 2019)
  - 54 sites participated
  - World-wide project: measure average speed of muons
- International Cosmic Day (4 Nov 2020)
  - 16 countries, 100 cities, 4700 students




http://globalcosmics.org

# World-Wide Data Day (W2D2)

## Oct 2019/2021 (24h)

- Participating groups: 48/43
- Students: 969/590
- Moderators: 8 / Videoconfs: 15

## Measurement

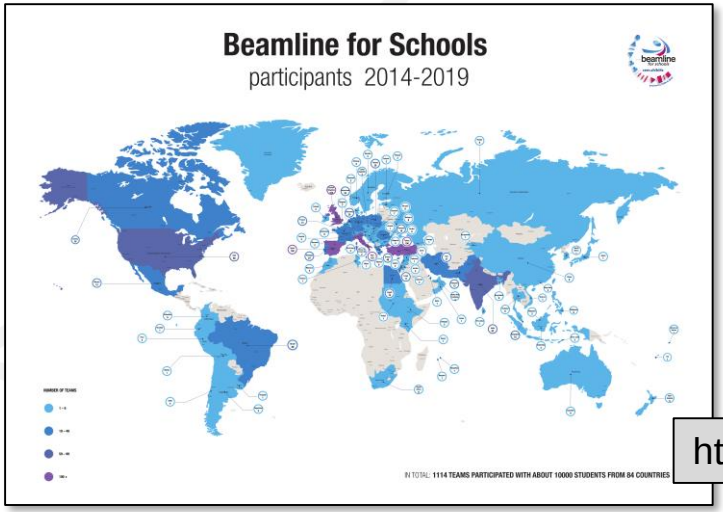
- Students worldwide analyse data from LHC events
- Data analysis at school, physics discussion in VC
- Measurement used in Chile, Mexico, Namibia workshops in 2018
- Great growth in Mexico: 9 groups
- Measurement stable

https://quarknet.org/content/world-wide-data-day

# CERN's Beamline 4 Schools

## IPPOG Participation

- Local Contacts to Schools
- Help Remove Language Barrier
- Give Guidance for Physics, Feasibility




http://beamlineforschools.cern

# Public Events & Festivals

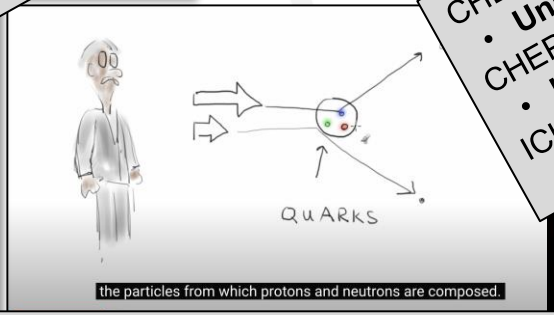
**Pohoda Festival**
Slovakia, 2019

**Colours of Ostrava**
Czech Rep, 2019

CHEP, Sofia, Bulgaria, 2018
- **Universal Science**

CHEP, Adelaide, Australia, 2019
- **Universal Science**

ICHEP, Online, **5 Aug 2020**
- **Big Bang Stage**




**http://universalscience.web.cern.ch**


Thank you