

# US-CERN Virtual Visits: Building Transcontinental Connections in High Energy Physics



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and the US LHC User's Association

Division of Particles & Fields  
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# Outline

## 1. What are Virtual Visits?

## 2. United States involvement; using VVs as:

- An educational tool
- A contribution to pop culture
- A political advocacy opportunity

## 3. Future efforts & expansion



A very young audience from **Poland** asking questions during a CMS Virtual Visit



An Iranian scientist guiding a CMS Virtual Visit from **Iran**

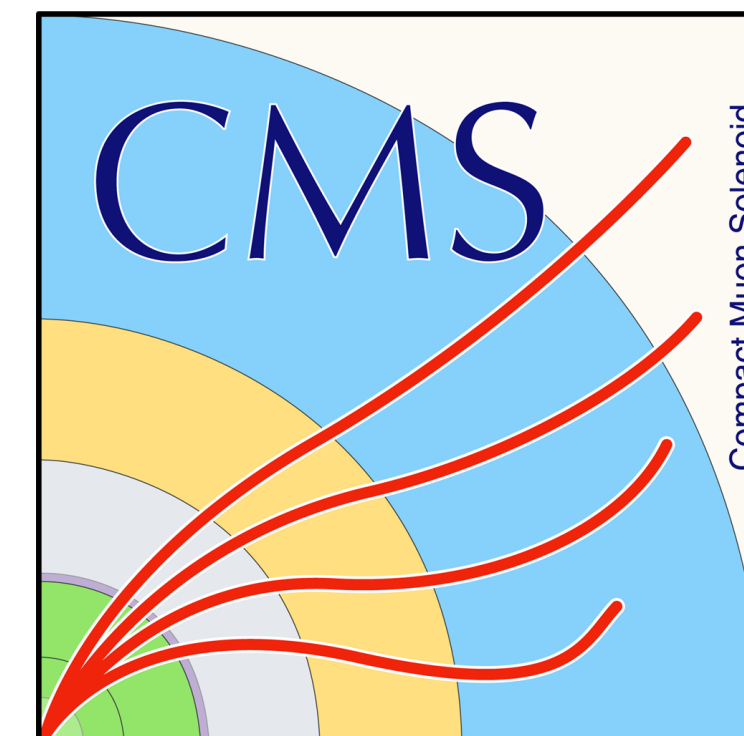


Guide answering questions from the ATLAS Control Room



# What is a Virtual Visit?

- Live conversation via videoconference, held in participant's preferred language, between physicists from ATLAS/CMS and remote locations around the world
- Provides access to the **ATLAS Control Room** and **CMS Experimental Cavern**
- Over 30,000 people from all seven continents have participated since program launch in 2010

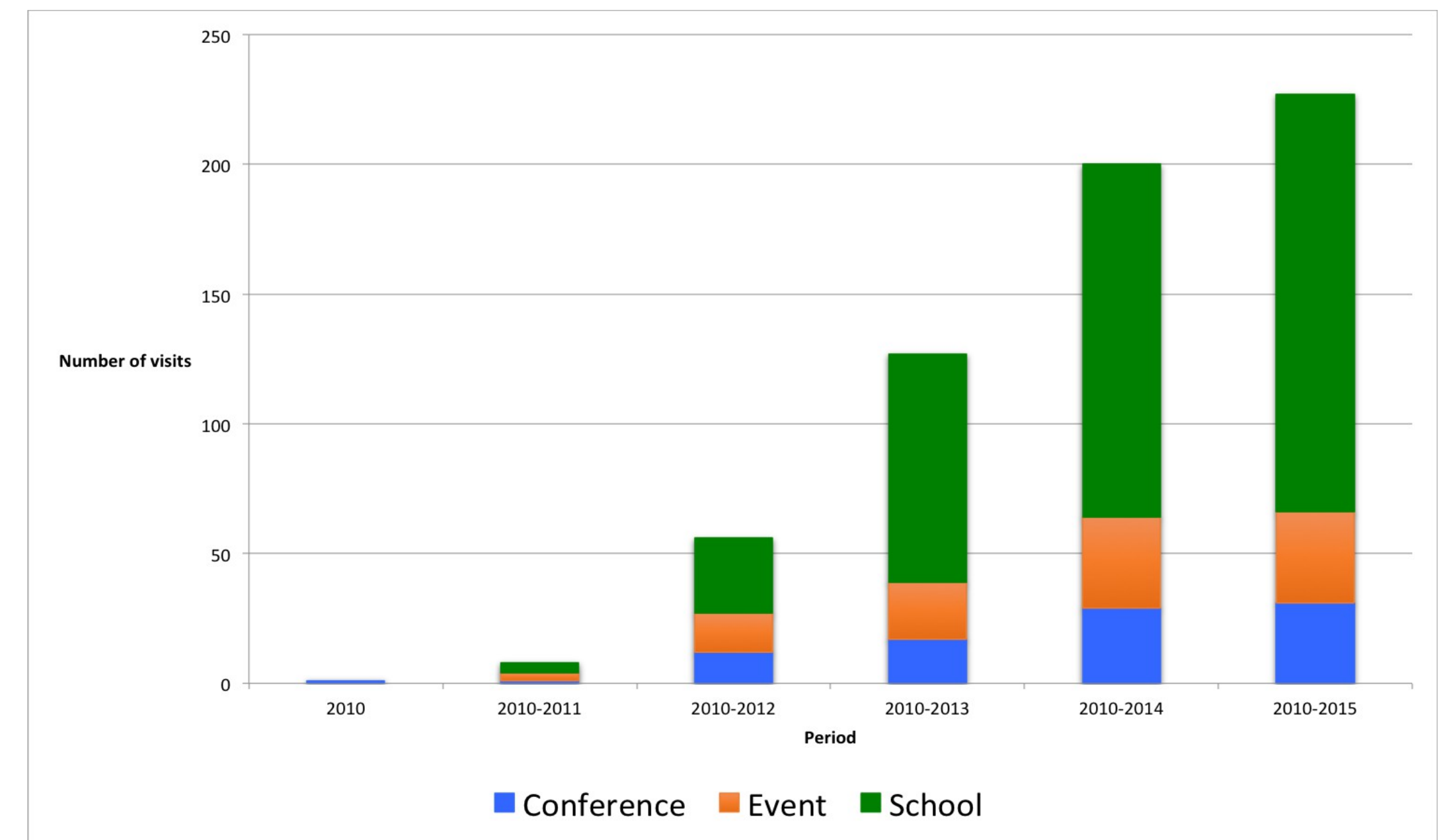




# Who Attends a Virtual Visit?



Green: ATLAS Virtual Visits; data from Nov 2010 - July 2015.  
Red: CMS Virtual Visits; data from Sept 2014 - July 2015.



Cumulative diagram showing evolution of ATLAS Virtual Visits per type of audience.

In 2017 so far:

- ATLAS: 28 visits, 4 American
- CMS: 39 visits, 1 American

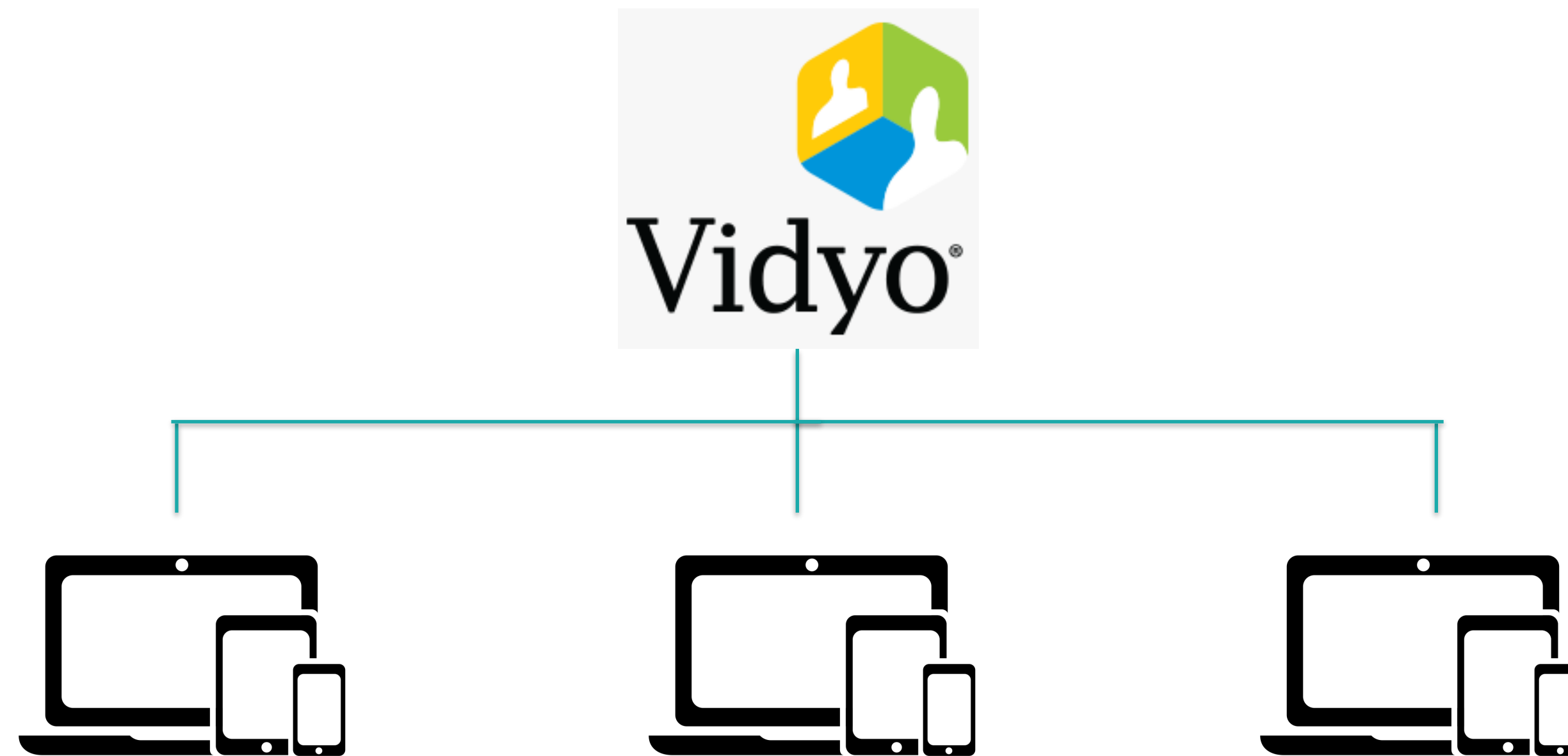


## Great potential for additional US involvement!



# Why Virtual Visits?

- **Easy to use:** requires only a device with an internet connection
- **Encourage engagement:** majority of visit is Q&A, exposure to specific role models (female/minority hosts)
- **Versatility:** option to broadcast or publish publicly, advertise on social media, or keep entirely private





# Educational Virtual Visits

- Partnership with QuarkNet: masterclasses
- Provides training opportunity for hosts on both ends of the teleconference
- CMS survey: 98% of participants expect that VVs “**will increase the interests of the participants in STEM**”



## 01. ATLAS

Holy Comforter Episcopal School, Tallahassee, Florida

21 February 2017

J. Gonski



## 02. ATLAS + LIGO

North Carolina School of Science and Mathematics, Durham NC

23 March 2017

2 August 2017



## 03. ATLAS

Greenhill School, Addison, Texas

9 May 2017



# Broadening Diversity

Remote audience (university students) from **Palestine** during an ATLAS Virtual Visit



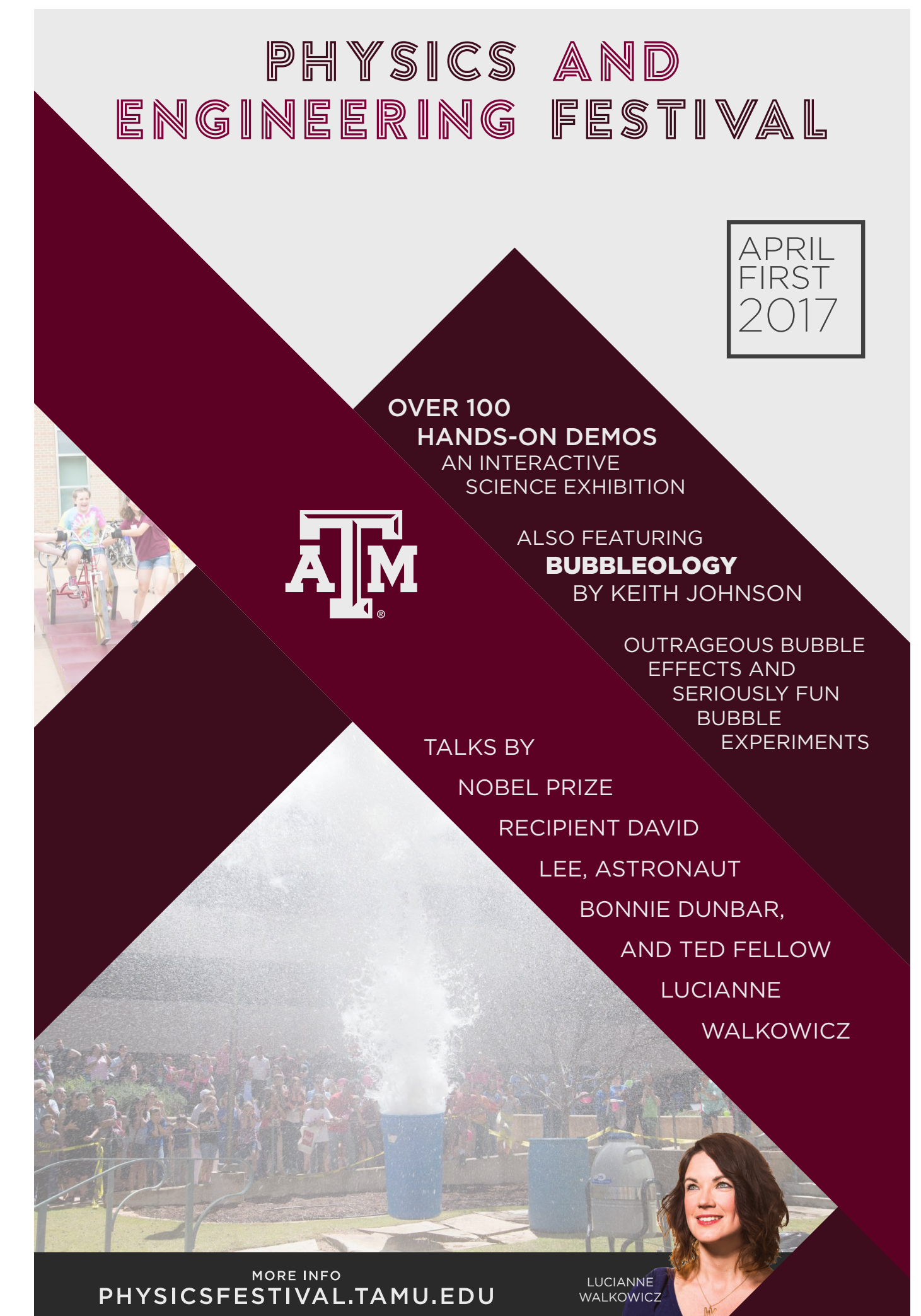
- 120,000 in person visits per year —> extend opportunity to various **nationalities, languages, and socioeconomic backgrounds**
- **‘Projecting Particles’** initiative: deepening physics education through media arts for secondary school students in underserved communities
  - Virtual Visit by Steve Goldfarb, 2013
  - Lakota Cosmology festival, 2017
  - Working with Native American & Cuban students





# Visits to Alternative Audiences: Pop Culture & Festivals

- Science is cool!
- 2017 Festival Visits:
  - 1. Physics Festival at Texas A&M University (CMS)**
    - April 1 in College Station, Texas
  - 2. Moogfest Music, Art, and Technology Festival (ATLAS)**
    - May 18-21 in Durham, North Carolina
    - Hosted by Mark Kruse, Kate Shaw, Steven Goldfarb









# Government and VIP Visits

- **Goal:** achieve benefits of in person government visits, while lowering barrier to entry of participation
- Collaboration with **US LHC User's Association:**
  - Serving as ex-officio member of Executive Committee & liaison to APS Council
  - Advertisement distributed on Congressional visit in March 2017



Visit of Caron De Mars, Environment, Science, Technology & Health Counselor, U.S. Embassy, Rome March 2017.





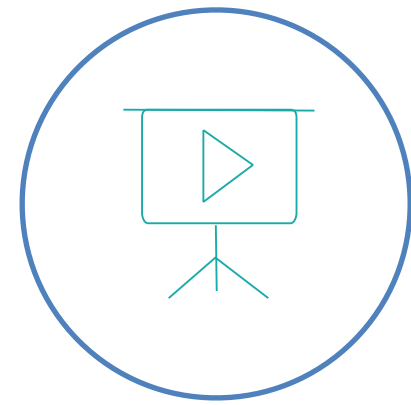
# CMS/ATLAS/LIGO Visit to Fort Hays State University



- High school teacher workshop on incorporating modern physics into the classroom
- **Congressional contact:** interest from Sen. Jerry Moran (R-KS) and Rep. Roger Marshall (R-KS)



# Conclusions & Future Efforts



## American Schools

Expand access for American students in schools across the country



## Pop Culture

Continued participation in festivals & other general public appearances, while searching for new opportunities



## Congress

Engage Congress, either via direct office VVs or from participation in constituency visits



## Diversity

Target underrepresented groups (gender, race, socioeconomic status, educational background)



The background image shows the ATLAS Control Room, a large facility with multiple rows of computer workstations and a curved wall of large monitors displaying various data visualizations and particle detector schematics. The room is dimly lit, with the primary light source being the screens. A person is visible working at a desk in the middle ground.

# Get involved!

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Contact [atlas-outreach@cern.ch](mailto:atlas-outreach@cern.ch) or  
[cms-outreach@cern.ch](mailto:cms-outreach@cern.ch) to become a guide or request a visit



# Resources

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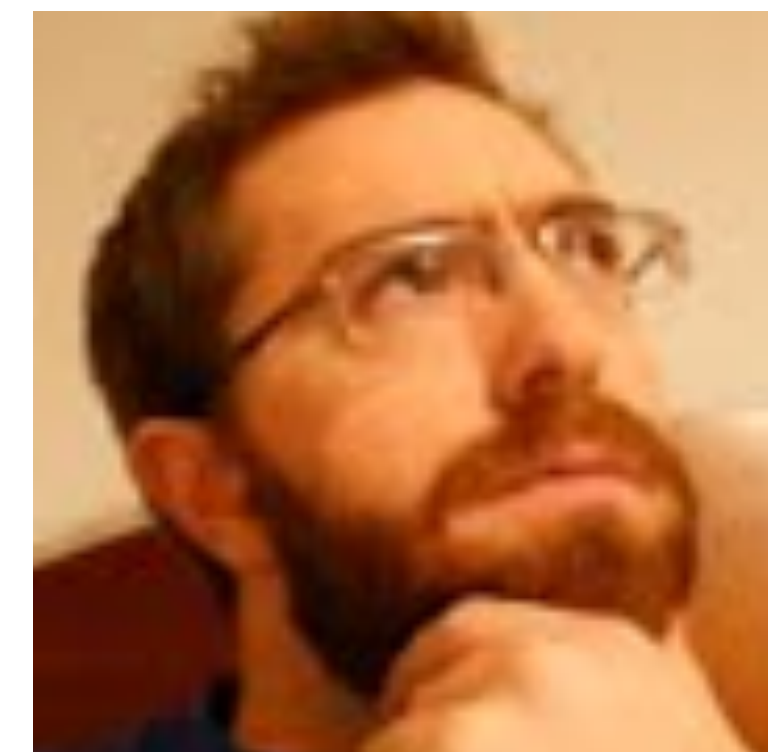
“ATLAS and CMS Virtual Visits: Bringing Cutting Edge Science into the Classroom and Beyond”. <https://cds.cern.ch/record/2132292>

Future and Past Events:

- ATLAS <http://cern.ch/atlas-virtual-visit>
- CMS <http://cms.cern/engage-with-cms/virtual-visits>



# Meet the Team



## ATLAS Virtual Visit team:

- Claire Adam Bourdarios
- Steve Goldfarb

## CMS Virtual Visit team:

- Marzena Lapka
- Angelos Alexopoulos

## American operators:

- Chris Martin
- Julia Gonski

**+ many others!**