

Outreach at the Telescopio Nazionale Galileo

Gloria Andreuzzi - INAF/FGG - OAR

I 25 anni del Telescopio Nazionale Galileo

Los Cancajos October 19 -21 2021



Since 2009 thanks to E. Molinari

Divulgación y Didáctica @ TNG

The *DYD@T* group today:

Gloria Andreuzzi

Ennio Poretti

Hristo Stoev

José San Juan

Adriano Ghedina

dydat@tng.iac.es

Follow us in:

www.tng.inaf.it/outreach/

Facebook:

<https://www.facebook.com/TelescopioGalileo>

Youtube:

<https://www.youtube.com/user/galileotelescope>

Twitter:

<https://twitter.com/TNGTelescope>



The LPIYA group

La Palma International Year of Astronomy

Since 2009

We are pioneering this coexistence using the public outreach, directed to the people of La Palma Island, because the institutions present at the Roque de los Muchachos Observatory (ORM) believe that it is not possible to continue living here without sharing our experience with the other 80,000 persons with whom we share the land and sky with. And also feel that a unique face is essential to let us know who we are, joined in a common scientific, and cultural, endeavor. The LPIYA Group gathers communicators and representatives from every institution present at the Roque de los Muchachos Observatory **with the objective of organising and coordinating public outreach activities mainly on the island of La Palma.**



Marco Pedani

<http://www.lpiya.org/>



SuperWASP



Círculo de Tránsitos Automáticos



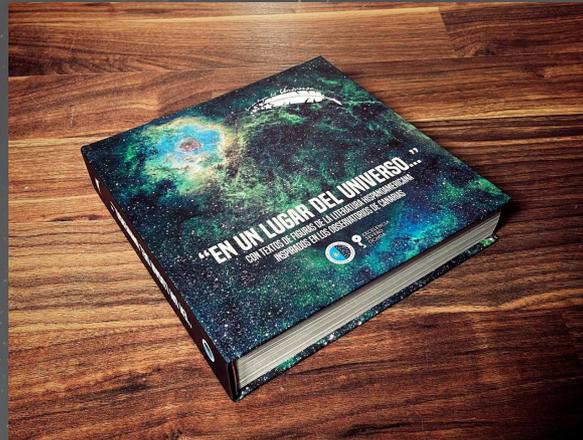
TELESCOPIO NAZIONALE GALILEO



TNG and IAC

Somewhere in the Universe ... En un lugar del Universo: The project started in 2016 as a collaboration between IAC, telescopes of the Canary Islands and the 'Science and the Cosmos' Museum of Tenerife. It merged Literature and Astronomy for celebrating the IV Centenary of the death of Miguel de Cervantes.

TNG participated at the project hosting three writers: Rosa Montero, Nicolas Melini and Juan Madrid.



part of the "European Researchers Night" project and financed by Marie Curie Sklodowska actions. The Night takes place the last Friday of every September. The MacaroNight project is a milestone for the European Researchers Nights, being the first project to bring together the Macaronesian archipelago in one single night where we will share and show our common heritage, culture and past, thus paving the way for a future full of Macaronesian researchers.

27 of September 2019 TNG participated with a live streaming from the bridge of the telescope.



TNG and INAF - 2014

Astrokids and Martina Tremenda

ASTROKIDS AVVENTURE E SCOPERTE NELLO SPAZIO



17. UNO, CENTO, MILLE PIANETI!

IL TI-ENNE-GI SUL VULCANO

"Con quella tua giravolta, navicella imbranata, sembravi ubriaca peggio di un pirata! Siamo finiti in un cratere rosso e arancione: ho fame, ho sete e indosso solo un maglione!"

Così si lamentava Martina, brava esploratrice appena tornata dalla Chioma di Berenice. "Martina, interrompi il tuo piagnisteo, ti ho portato al ti-enne-gi, telescopio Galileo."

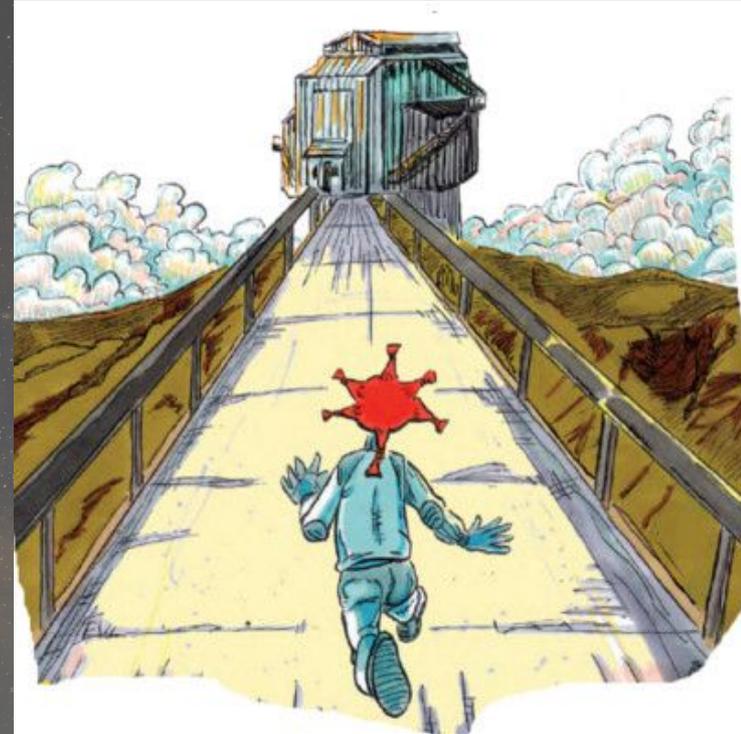
Disse l'astronave: "Siamo sul Taburiente, dove ogni stella è più splendente". "Ma ti avevo chiesto di andare lontano non su un'isola, dentro un vulcano!"

"Il ti-enne-gi ruota sul piedistallo, elegante come un principe al ballo. Ha scoperto anche un nuovo pianeta, grande, infuocato come una terra segreta."

Laggiù in ventiquattro ore passano tre anni: ogni giorno festeggi tre compleanni! Tu avresti almeno 5 mila anni di età, è una fortuna che tu sia nata qua."

"Astronave, sei del tutto fusa: non fare la poetessa e chiedimi scusa! E poi chi lo sa," rispose Martina, "i mondi lassù, sono così belli che non me ne andrei più."

Ho incontrato tanti amici assai diversi, ognuno di loro vale cento universi. Penso che in ogni loro casa starè bene, tutti mi hanno preparato delle ottime cene!"



129

L. Daricello and S. Sandrelli.

TNG contributions: S. Masiero, E. Molinari and G. Andreuzzi

'Il ti-enne-gi quando ruota sul piedistallo,

è elegante come un principe a un ballo'

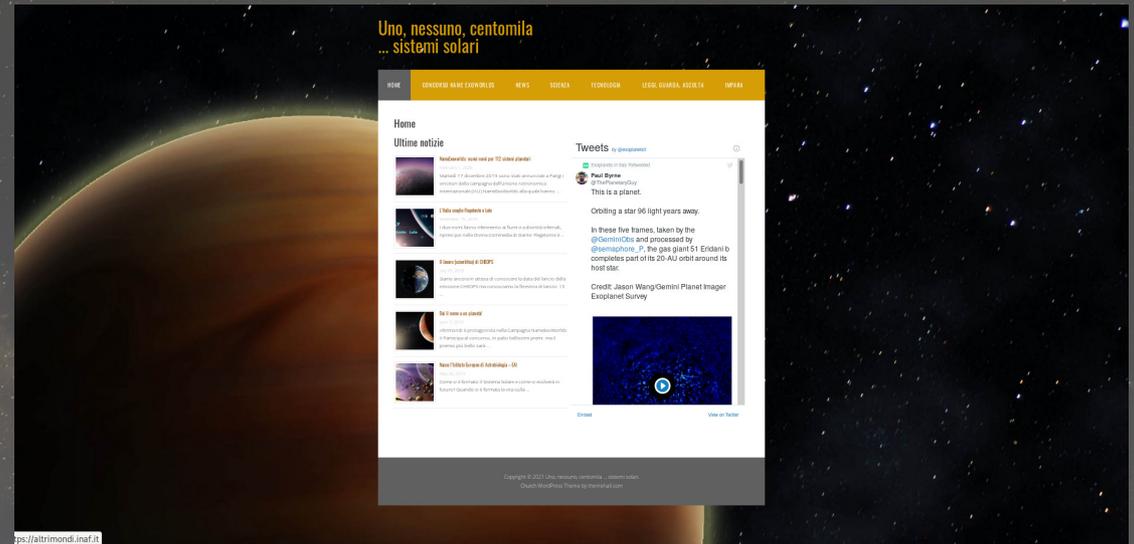


TNG and INAF - 2014

Uno, nessuno, centomila sistemi solari: a webpage for exoplanets

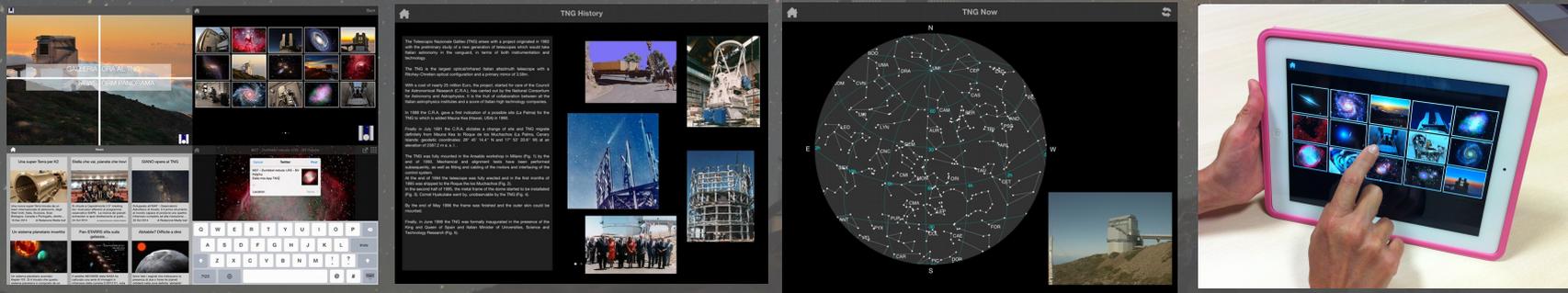
C. Boccato, S. Masiero, V. Guido, E. Molinari, G. Andreuzzi

<https://altrimondi.inaf.it>



MyTNG: an iPad application for the TNG

MyTNG Includes a gallery of astronomical images obtained at the TNG, a news-feed of the latest TNG highlights, a real-time information of the telescope activity.



E Molinari, V. Guido, A. Harutyunyan, P. Franzetti, M. Scodreggio, P. Caraveo, G. Andreuzzi

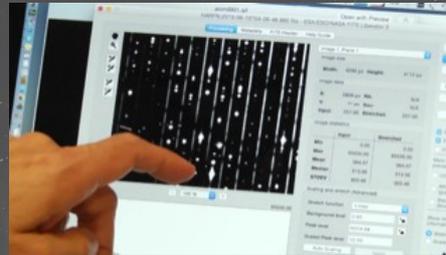
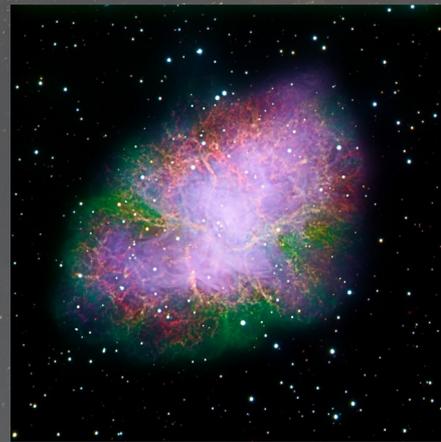
TNG and the INAF videos: 2017

The project: Nuove Tecnologie e attività di laboratorio per la promozione dell' astronomia

Video by: INAF – FGG

Supported by the MIUR

FGG contributions: E. Molinari, G. Andreuzzi, V. Guido



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Gloria Andreuzzi – Los Cancajps , October 19



TNG and INAF today

- The Earth's Day: April 22 – live streaming from the bridge of the telescope (RAI)
- Researchers' Night: September 24 - live streaming from the dome and the control room of TNG
- Festival di Genova: October 26 2021
- October 31: Planned observations of the comet 67P/Churyumov-Gerasimenko (EduINAF: Il cielo in un salotto, November 8)
- Festival di Roma: November 22
- Futuro Remoto: December 2



Visits and guests

<http://www.tng.iac.es/outreach/visitingtng.html>

- Open days at the telescope: organized by IAC with Starlight guides (~ 600 people/year) – until 2018
- Special day dedicated to Garafia people: 'Día de Garafia'
- Authorized groups: Canary Islands Winter Schools of Astrophysics, Neon Summer School, teachers groups, Starlight group, Magic School
- Italian schools: Livorno, Monza, Mestre, Lugano, Belluno, Liceo di Madrid
- High schools from La Palma: Nuestros Alumnos
- Schools from Canary Islands and Europe
- The Florence University's project (see M. Romoli presentation)
- Olimpiadi Italiane di Astronomia since 2009
- PCTO students since 2016
- Media: local media, MediaInaf, EduInaf, National Geographics, writers, photographers
- Televisions: RAI, BBC, RTVE, NHK television, TV Canarias, Space TV



The visits at the telescope

Number of groups

Year	schools	groups	publics	private	webcast	lessons/talks	media
2009	4	9	14	10	3	3	1
2010	11	12	11	5	...	17	4
2011	5	9	18	3	1	5	8
2012	1	6	13	2	...	...	3
2013	10	6	6	2	6	4	2
2014	3	10	14	5	14	...	6
2015	5	6	2	2	1	2	7
2016	6	8	10	4	...	3	3
2017	10	6	11	1	...	5	5
2018	8	5	3	...	...	9	3
2019	9	3	1	...	1	5	...
2020	...	...	...	...	3	6	...
2021	...	...	...	...	2	16	2



People for group

Year	schools	groups	publics	private	total visitors
2009	100	100	350	50	600
2010	300	80	275	15	670
2011	100	215	500	12	827
2012	30	90	325	5	450
2013	205	90	200	5	500
2014	40	132	350	8	530
2015	100	70	75	5	530
2016	65	85	225	10	385
2017	175	70	270	5	520
2018	300	55	75	...	430
2019	220	80	14	...	320
2020	...	...	...	...	...
2021	...	...	...	...	...



Gloria Andreuzzi - Los Cancajps, October 19

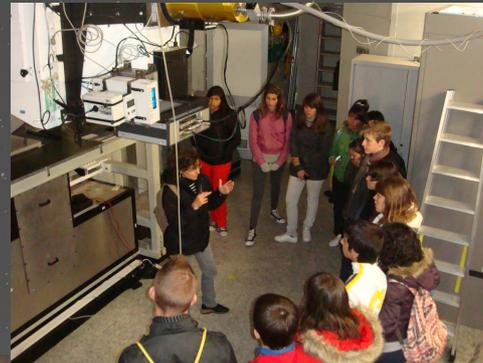


TNG and the schools

- AstrArte: a collaboration with the Escuela de Arte de Santa Cruz de La Palma – 2009
- Childrens: lessons, plays, webcasts
- El Espacio: Playing with the Astronomy – a project for children (4 - 12 age old) – since 2015
- El telescopio Nazionale Galileo y los niños: drawing competitions - 2017
- The schools from Italy: lessons, webcasts and visits at the telescope
- Nuestros Alumnos: high schools from La Palma - since 2009
- The Dutch School - since 2017
- The Florence University' s project with L. Casetti, M. Romoli, B. Lusso, R. Stanga - since 2016
- 'Olimpiadi Italiane di Astronomia' with G. Cutispoto, A. Misiano, S. Varano - since 2010
- PCTO students - since 2016
- Habla con Ella's project in collaboration with IAC - since 2020
- The Student week. Three lessons in collaboration with Messina – since 2020



The schools – before de COVID19



The schools during the COVID19



During the Covid19 Pandemic the visit of the schools are not allowed

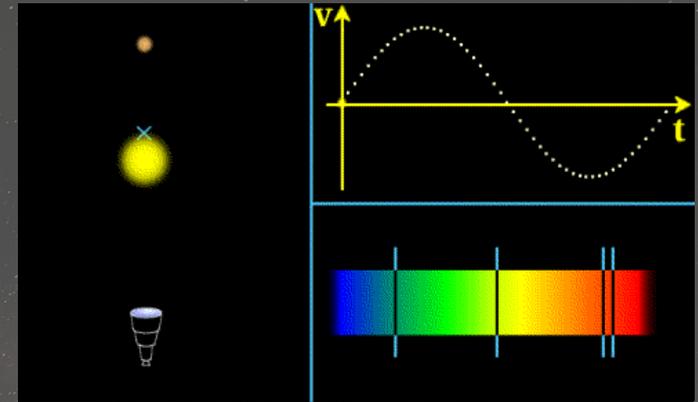
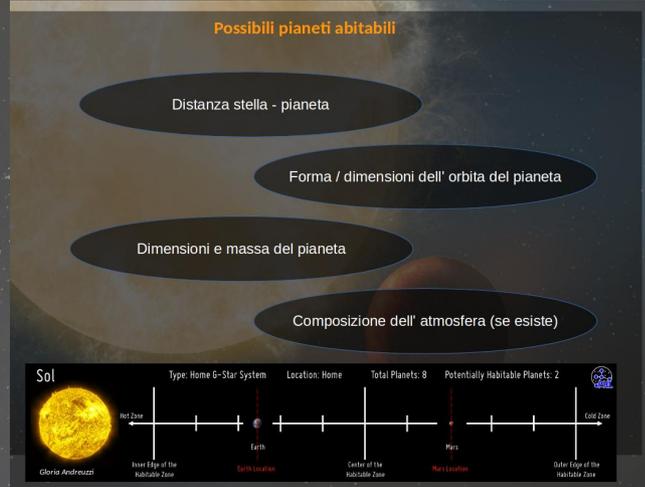
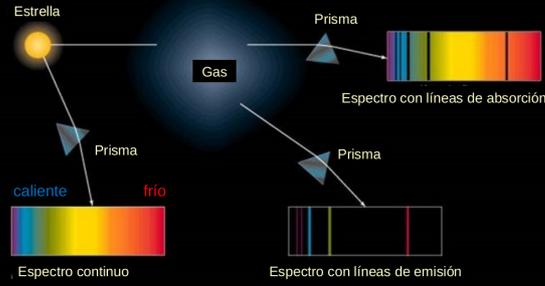
Substituted by live streaming from the telescope and online lessons



The schools

Looking for exoplanets

Cada elemento químico tiene su "código de barras"



Il Sistema Solare

	Diametro (km)	Distanza dal Sole (10 ⁶ km)	Tempo di viaggio con Space Shuttle (anni)
Sole	1.392.000	0	0,0
Mercurio	4.878	58	0,2
Venere	12.104	108	0,4
Terra	12.756	150	0,6
Marte	6.792	228	0,9
Giove	141.700	778	3,0
Saturno	120.000	1.427	5,4
Urano	50.800	2.870	10,9
Proxima Centauri sistema (triangolo)	-	4,2 s.l. = 39.736 10 ⁶	151203



Alla ricerca della vita

La Terra possiede una atmosfera di ossigeno e oceani di acqua.

Piante ed esseri viventi che producono ozono, metano etc...

Le impronte chimiche della vita si possono rivelare attraverso la spettroscopia

On: Gloria Andreuzzi / Ryahyan / TNG

HARPS-N el cazador de planeta extrasolares en el TNG

Para detectar planetas extrasolares HARPS-N necesita de una grande precisión. Esto se consigue solo si el instrumento está en un cuarto bajo vacío y sin cambios de temperatura.

Planetas descubiertos por HARPS-N

Nombre	Masa (terrestres)	Radio (terrestres)	Periodo (días)
Qatar-1b	381	13	1,5
Kepler-78b	1,9	1,2	8,5

Gloria Andreuzzi - 19.03.2014

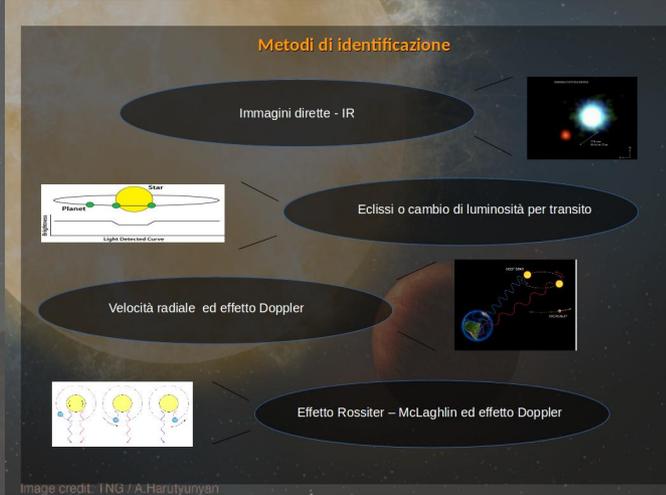


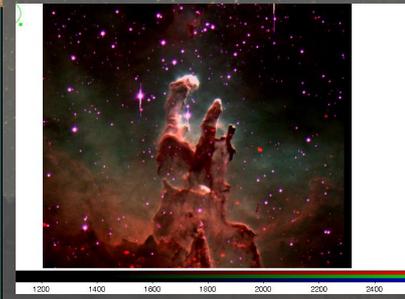
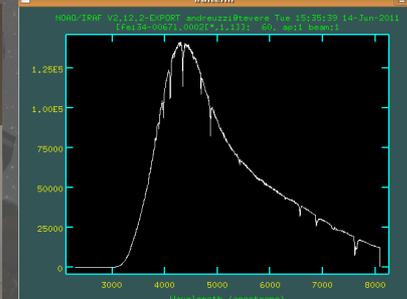
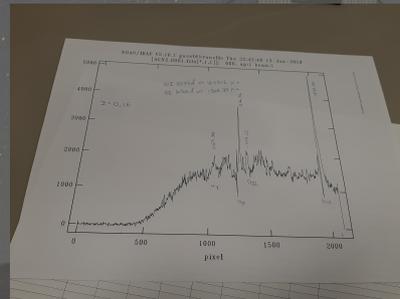
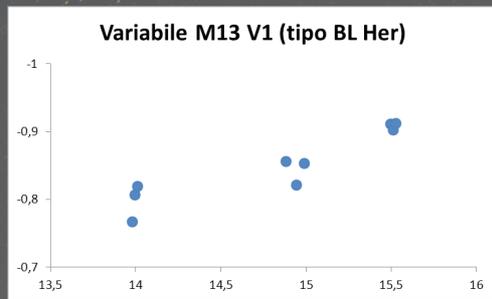
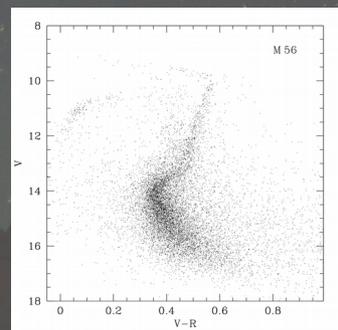
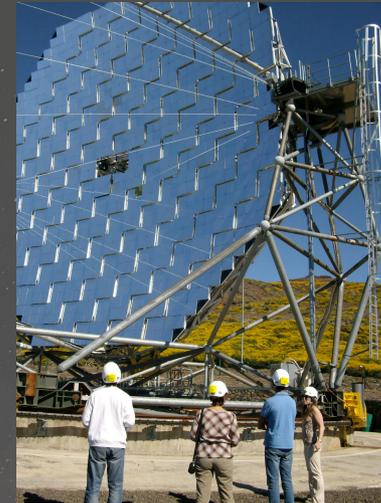
Image credit: TNG / A. Harutyunyan



Olimpiadi Italiane di Astronomia

A night as astronomers

- 2010: M56 CMD – M16 three color images
- 2011: M5 - SN2011dh - Feige66
- 2014: C/2012K1 the Panstarrs comet
- 2015: M13 variability curves
- 2016: Rosetta comet observations
- 2017: The couple of galaxies NGC4151 - NGC4156
- 2018: The galaxy M94
- 2019: AGN spectra



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PCTO @ TNG

before the COVID19

- Visit the TNG and other telescopes of the Roque de Los Muchachos Observatory
- Visit at our laboratories
- A night as an astronomer:
 - Observations
 - Data analysis
 - Three color images
- learning to use the 3D printer and the associated software

~ 60 hours of activities under the responsibility of the TNG staff



2016: *Aspetti gestionali ed operativi di un Osservatorio Astronomico* – E. Molinari and G. Andreuzzi / FGG
Liceo Scientifico e Linguistico Statale Paolo Giovio (Como) – C. Giudici and X. Huang

2017: *Un' osservatorio per la ricerca degli exoplanet* - E. Molinari and G. Andreuzzi / FGG
Liceo Scientifico e Linguistico Paolo Giovio (Como) – M. Leoni and F. Zhou

2019: *Caratterizzazione di strumentazioni visiting e ausiliarie al TNG* - A. Ghedina / FGG
Istituto Statale di Istruzione Superiore Galilei-Tiziano (Belluno) - G. Rovelli

PCTO @ TNG

During the COVID19

- live streaming from the dome of the telescope and from the control room
- online lessons: from 4 to 60 hours of activities

2020: G. Andreuzzi / FGG and the Liceo Scientifico Sansi Leonardi Volta (Spoleto):

- streaming from the control room and 3 online lessons
- *L' Astronomia e lo spettro elettromagnetico*
- *L' effetto Doppler ed I pianeti extrasolari*
- *Il Telescopio Nazionale Galileo: un telescopio tutto italiano*

2021: *Stima dei punti zero fotometrici di LRS@TNG con l' uso di Python*, A. Harutyunyan / FGG
A. Valli Liceo A. Degasperì Borgo Valsugana (Trento) – by remote connection

Progettazione, montaggio ed allineamento di un sistema ottico, M. Cecconi, G. Andreuzzi / FGG
M. Gualtieri Liceo A. Degasperì Borgo Valsugana (Trento) - by remote connection
In collaboration with R. Claudi (Padova Observatory) – in presence

2021: G. Andreuzzi / FGG and 60 students from the Liceo A. Degasperì Borgo Valsugana (Trento):
Streaming from the dome of the telescope and online lesson:
Il Telescopio Nazionale Galileo: un telescopio tutto italiano





Our Pupils and the Roque de los Muchachos Observatory

The LPIYA Group and the schools on La Palma are working together to bring astronomy to every student aged 14-16 offering a talk, a workshop activity, a solar observation with a Solar Lunt telescope (10 cm + H α filter) and a visit to one of the telescopes, all by an astronomer working at the Roque de los Muchachos Observatory. This own project started in 2010 is a big joined effort of every user institution, involving more than 20 astronomers.

<http://www.lpiya.org/nuestrosalumnos>

Inicio | Quiénes Somos | Contacto | Observatorio del Roque de los Muchachos

Nuestros Alumnos y el Roque de los Muchachos

Un programa de actividades para la comunidad escolar de la isla de La Palma organizado desde el Observatorio del Roque de Los Muchachos

El programa "Nuestros Alumnos y el Roque de los Muchachos" pretende divulgar la ciencia y la tecnología, a través de la astronomía, y las actividades que se desarrollan en el Observatorio del Roque de los Muchachos entre todos los alumnos de cuarto de la ESO en La Palma (relación de centros participantes) todos los años impartiendo charlas, talleres y organizando visitas al ORM.

El presente programa es una acción conjunta de las instituciones presentes en el ORM organizados como Grupo LPIYA, y fue diseñado, y lo ponen en práctica, este equipo.

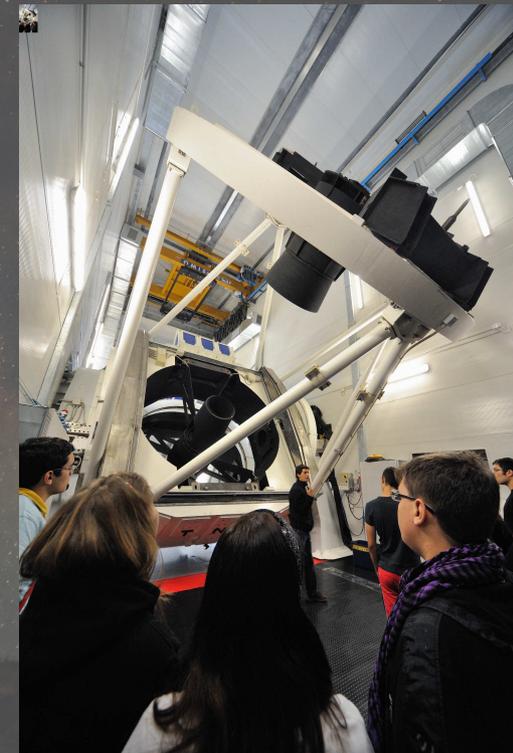
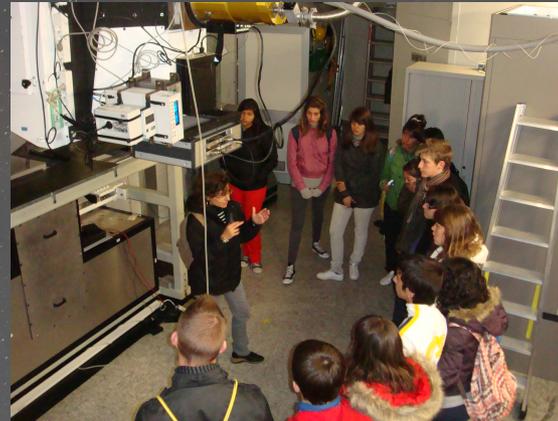
ORGANIZADORES:

PATROCINADORES:

COLABORADORES:

INTRANET
(documentos, contactos, informes...)

Síguenos:



Habla con Ella

Mujeres en Astronomía



Women scientists show their work and answer to student's questions. A collaboration with IAC

N. Rodríguez Eugenio (IAC), G. Andreuzzi (FGG), C. Padilla (FGG) et al.

Un cielo protegido por ley...

DECLARATION IS DEFENCE OF THE NIGHT SKY AND THE RIGHT TO STARLIGHT

Casi toda la información que nos llega del Universo es en forma de LUZ

Multiwavelength Whirlpool Galaxy

COOL LOW ENERGY RADIATION | VISIBLE LIGHT | HOT HIGH ENERGY RADIATION

El Sistema Solar

www.esa.int/kids

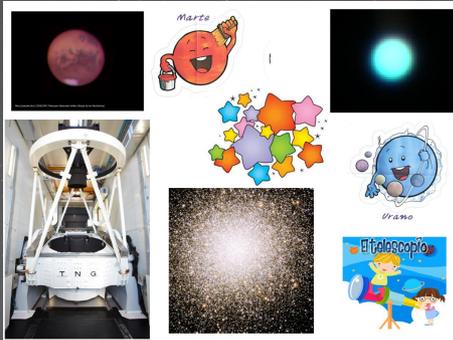
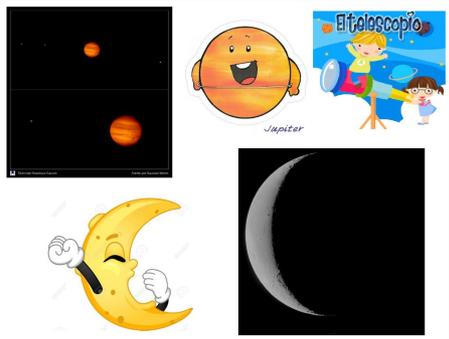
El Telescopio Nazionale Galileo

Estrellas que mueren

SN 2008ha



TNG and children Space project



El TNG y los niños

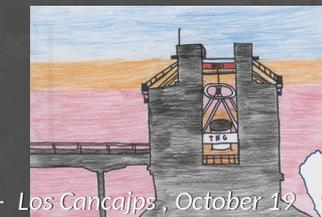
May 2017: competition for the selection of the best draw representing the TNG

Gloria Andreuzzi, Emilio Molinari, Ariadna Rodriguez

<http://www.tng.iac.es/news/2017/06/23/drawing-competition/>

- > 3 institutes and 300 children from 4 to 12 years old were involved
- > prizes for the first 3 winners of each age

Winner draws have been used to create stickers for the telescope



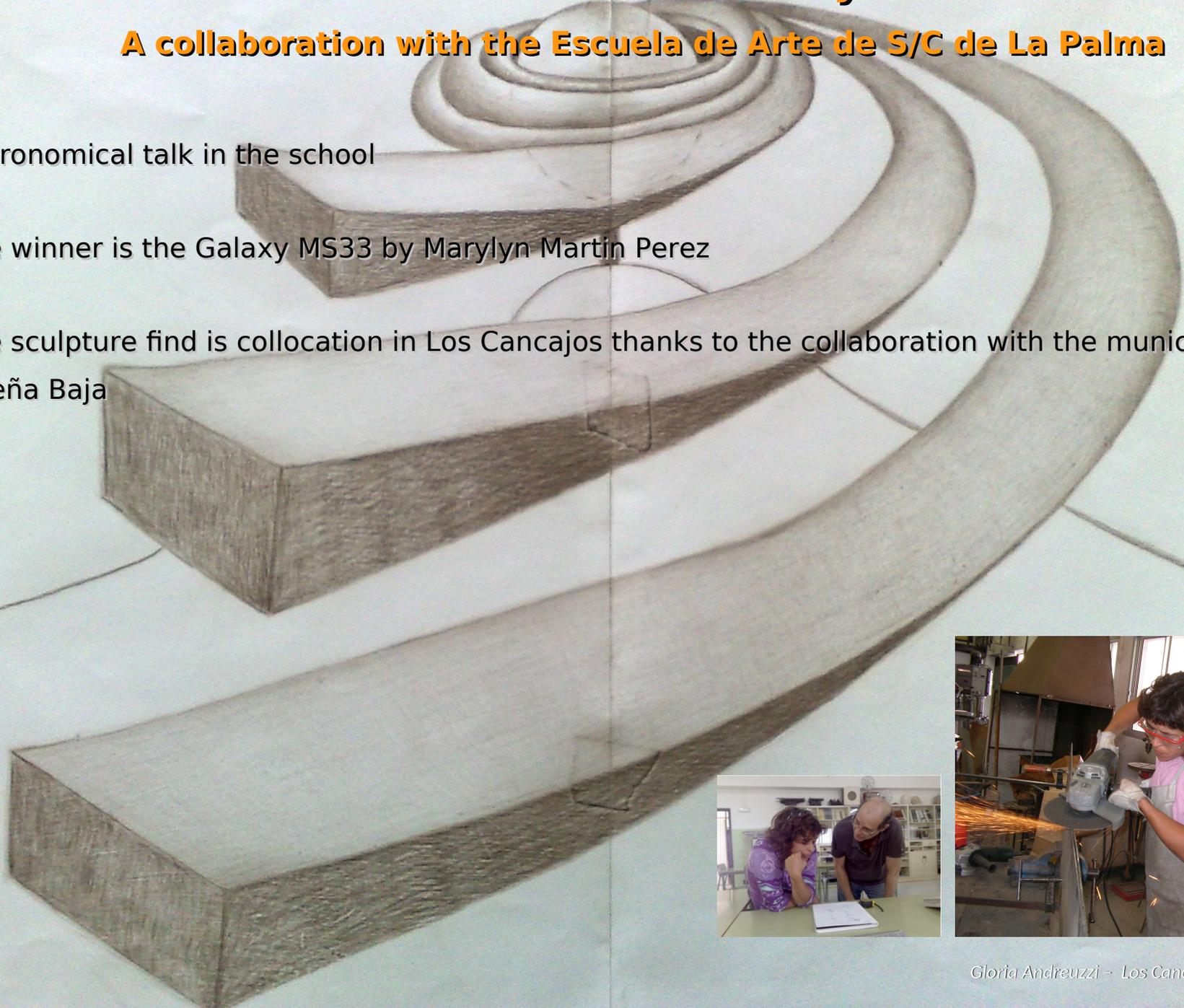
AstrArte: Astronomía y Arte

A collaboration with the Escuela de Arte de S/C de La Palma

2009: astronomical talk in the school

2010: the winner is the Galaxy MS33 by Marylyn Martín Pérez

2015: the sculpture find is collocation in Los Cancajos thanks to the collaboration with the municipality of Breña Baja



AstrArte: Astronomía y Arte

In 2015 thanks to the collaboration with the municipality of Breña Baja, the galaxy find is collocation in Los Cancajos close to the street connecting the airport with Santa Cruz de La Palma.

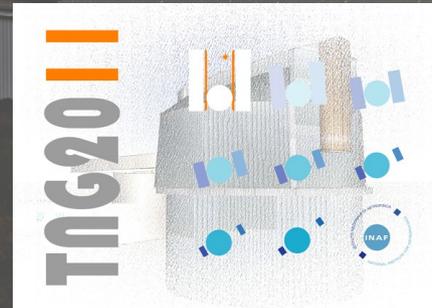
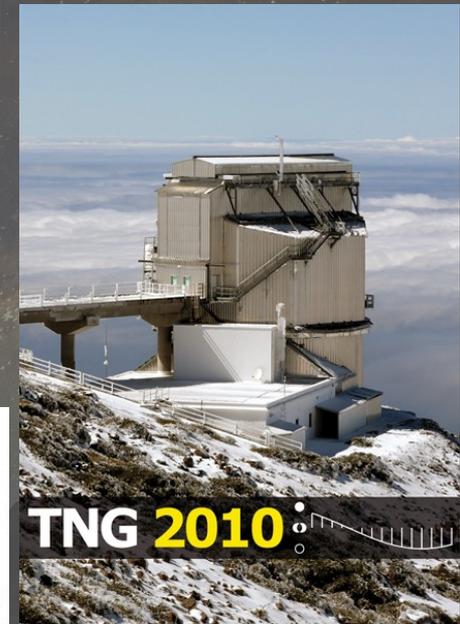
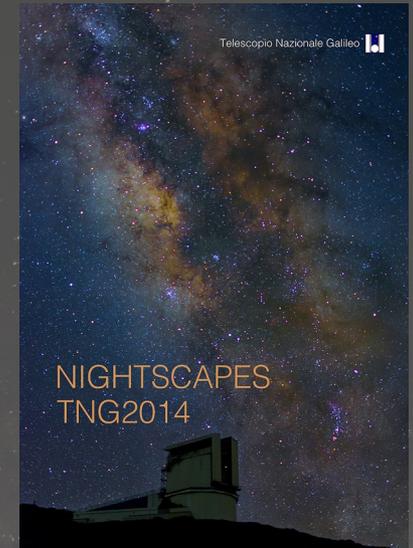


CalendarStars

the DDT1 time

Since 2010

<http://www.tng.inaf.it/cal2021>



Mercury transit live from the Roque de Los Muchachos Observatory

11 November 2019

➤ 12:35 UT - 18:27 UT: streaming of the transit from Roque de Los Muchachos; 5 h 29m

<https://www.youtube.com/watch?v=hUd6HgfqOv8>

➤ 12:15 UT - 16:15 UT: talks for schools and general public from the Control Room of the TNG

12:15 UT: Transits of inferior planets of the Solar System

13:30 UT: Estimation of the Solar diameter and the Astronomical Unit using the Venus transit

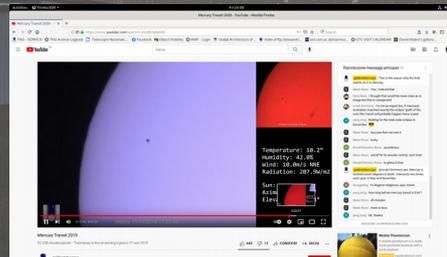
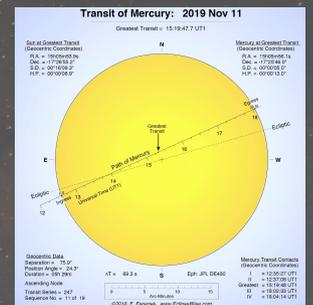
15:00 UT: Transit and Doppler effect to discover extrasolar planets

16:00 UT: The TNG and the extrasolar planets

➤ Observations:

solar telescope equipped with H α filter

Maksutov telescope equipped with a broadband solar filter



The streaming

Total visualizations: 52308

Maximum number of simultaneous viewers: 2018

Total number of chats: 2026



Strange worlds, Oceans on the Earth and beyond

Mundos extraños, océanos en la Tierra y más allá

Permanent Astrobiology exhibition in Fuencaliente Lighthouse

Are we alone in the universe?

Only recently we have had the possibility of a scientific approach to this question with a truly interdisciplinary science, Astrobiology, that allows us to find out if and where there is other life in the universe.

A collaboration between the Municipality of Fuencaliente, the European Astrobiology Institute And the telescopes of the Roque de Los Muchachos Observatory.



May 14 2021: presentation of the project in the Centro de visitantes Volcán de San Antonio (Fuencaliente).



Rénder por Martina Rocchini



Toward the next 25 years!

THANK YOU!

