SISSA

FOR SCHOOLS

SISSA FOR SCHOOLS

2020-2021

EVALUATION REPORT

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Summary

1. EXECUTIVE SUMMARY

The school year 2020-2021 has been the eighth year of *SISSA for schools* (S4S): a very successful program known not only locally, but also outside the Friuli Venezia Giulia region, appreciated by teachers, educators and students. The 2020-21 program of SISSA for Schools was shaped on the traditional structure and adapted to the emergency due to the COVID pandemic in two main activities:

- The Thursday visits where school classes were “virtually” welcomed in SISSA
- The Student Day, the special event dedicated to students of the last two years of high schools.

Altogether, S4S 2020-2021 involved a total amount of about 1000 students.

As usual, the activities were mainly proposed and leaded by SISSA PhD students with the support and the organization of Sissa Medialab.

SISSA for schools is part of EUCUNET, the international network of Children’s Universities.

1.1 Objectives

S4S seeks to promote SISSA, its international status and the very high quality of its research to the younger generation, especially to those living in the Friuli Venezia Giulia Region. S4S aims at showing young people, from a very young age, how science is really made in SISSA, through its scientists, technicians and staff, thus offering a picture of what science and scientists’ life really is.

Our objectives from the very first year of S4S can be summarized as follows:

Get support. The scientific community cannot do without the support of society, which provides direct financing, or indirectly, legislation that facilitates scientific and technological research.

Gain trust. In the absence of an attitude of trust in the scientific community, both facts and figures may be challenged by large groups of citizens, including policymakers. Gaining trust and being considered reliable partners require a careful and continuous communication commitment.

Improve governance. There are complex and controversial issues on which citizens are called to decide upon together with policy makers, stakeholders and the scientific community (see, *e.g.*, energy problems or some health issues). The scientific community must find ways to communicate with all members of society because their motions and knowledge have a say in the governance of science and technology. Young people are the adults of tomorrow, and it is necessary to build a new and more aware concept of citizenship.

Support recruitment. Communicating science is also necessary to create a positive image of scientists as professionals, to attract new generations of researchers.

Foster information and education. Provide information on current scientific research, but also provide a scientific perspective on the news, and contribute to scientific education of the young are the most universally known goals of science communication. In addition, education is not just about knowledge transfer, but also about the construction of a scientific citizenship able to raise awareness on the importance of engaging in behavior, both public and private, of sustainable progress and of respect for the environment.

For all these reasons we tried to show science as a vital, useful, beautiful human activity, made by many intelligent, passionate, professional young women and men coming from many different countries.

2. OVERVIEW OF THE INITIATIVE

Starting from March 2020, due to the COVID emergency, SISSA for schools introduced **SISSA for schools – Digital Edition.** The concept behind the project was "*if students could not come to us, we could bring a piece of SISSA to their home*".

We met schools digitally, through a video call, using the Zoom platform. One of the greatest challenges was to engage students actively. Such interaction is generally easy to facilitate in a face-to-face situation. This has become more difficult in the digital sessions, where students sit at home alone often with the cameras turned off. We have thus introduced polls, quizzes, videos and various tools to keep their attention and increase participation. The result has been satisfactory, as we were able to trigger high levels of interaction.

To cope with the uncertainties due to the pandemic, S4S – Digital Edition 2020-2021 was split in two parts (October 2020-February 2021; March-May 2021). This allowed us to be flexible and adapt the program in case the situation would have allowed us to welcome visitors in the SISSA premises. As we all know, this was not the case.

The two calendars were made available to the public on September 18th and on December 9th, respectively, both via email to our mailing list and via announcements on SISSA's website. For the 24 available slots, October 29th, 2020 to May 27th 2021, we have received more than 140 requests. The slots have been filled within few hours and we accepted classes from different schools and grades, from the first year of primary school to the fifth year of high school.

Beyond regular school visits we proposed the seventh edition of the *Student Day* and for the first time, digital: it took place on February 25th on Zoom giving more than 500 students in their final years of high school the opportunity to participate in a whole morning of activities dedicated to them.

We will never stop repeating that S4S would not be possible without the collaboration of many PhD students, post-docs, administrative and technical staff and senior scientists. About 160 guides, speakers and explainers took part in the 2020-2021 school visits activities. The scientific secretariat, as well as other areas' secretaries and the IT staff made an invaluable contribution to our public engagement activities.

2.1 Thursday's school visits

Promotion

The 2020-21 S4S program was promoted by means of an invitation sent to all the official email addresses of schools located in Friuli Venezia Giulia and to those schools and teachers who had already participated to previous SISSA outreach activities and were thus included in S4S mailing list. The program was published on SISSA's website. The available slots were booked in one day, while non successful requests were inserted in a waiting list.

Many of our visitors came from schools outside of the Trieste area: both within the Friuli Venezia Giulia region (Udine, Cervignano, Pordenone) and outside of the region (Torino and Modena).

Thursday visit structure

Students of all ages took part in our activities, from very small children of the first year of primary school to students of the last year of high school. In particular,this year we had 8 primary school classes, 6 junior high school classes, and 10 high school classes for the Thursday visits (Tab. 1). We accommodated one school class at time to ensure a better connection between students and volunteers during participatory activities. This was particularly important for the digital edition.

Program of S4S – Digital Edition

For all groups the program was the following:

- Brief introduction to SISSA, a welcome video of the SISSA Director, Stefano Ruffo and a quick presentation of the volunteers

- Interactive game “Guess who – SISSA Edition”
- Interactive activity
- Question time.

Activities

The activities were adapted to the age of the students:

- I-II primary school (6-8 year old): extremely interactive activities with a lot of games and very simple language
- III-V primary school (8-11 year old): interactive activities, more specialized language and more demanding tasks
- I-III junior high school (11-14 year old): participatory and interactive laboratories, short seminars.
- I-V high schools (14–18 year old): participatory and interactive long seminars.

Interactive “Guess who – SISSA Edition”

Despite the success of the first version of S4S – Digital edition, one of the things that was most missed was the students’ interaction with the SISSA environment and the volunteers, both for primary school’s children with the “escape game” and with the “SISSA tour” for high school students. In order to overcome this 2shortage” we introduced a game, inspired by the gameshow “Soliti ignoti”.

The game structure

There are 4 hidden identities and 4 descriptions regarding the field of study of the participants. Students must associate each volunteer to the correct description and to do this, we show them the picture of the volunteer along with name, age and nationality (Fig. 1). Also two clues are presented to the audience: one is not related to the job (*i*.i. “I like chocolate”, “My favourite film is ...”) and the second one related to his/her job avoiding any spoiler. Once students guess the identity, the game player switches on the camera and talks a little bit more about his/her job. Then, students are free to ask any kind of questions. It is a moment of interaction and fun, because students, especially the younger ones, are really curious, and the game sometimes lasts 30/40 minutes.

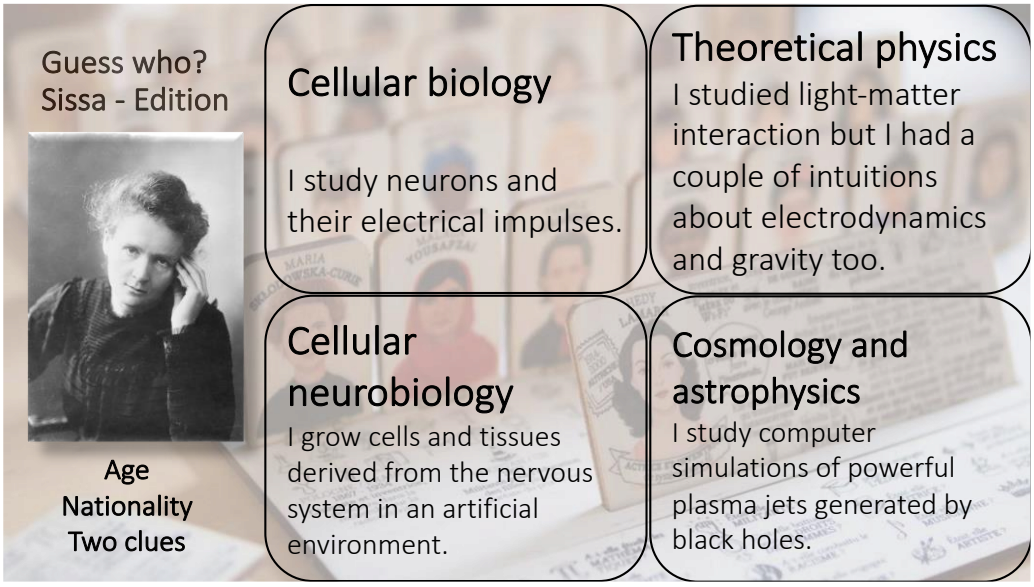


Figure 1: Example of the “Guess-who” game used for junior and high school students.

Table 1. School visits in numbers 2020-2021

Digital visits on Thursday	
Number of visits	24
Students	515
Schools	18
Classes	30 (119 on the waiting list)
Student Day	
Students	503
Classes	26 (10 on the waiting list)
Activities proposed	29
Total number of students involved	1018
SISSA volunteers	160

2.2 Student Day

The 2021 edition of SISSA Student Day – Digital Edition was organized on February the 25th to give students in their final years of high school a glimpse of the life and work of research scientists. The Student Day has been designed to open a window on science and research with a wide range of seminars, demonstrations, interactive lectures, virtual laboratory visits, discussions, and meetings with researchers.

During the event, regular activities were suspended and all SISSA was entirely at the students' disposal. More than 500 students participated and could freely select among 29 different activities such as seminars, virtual labs, discussion game. The Student Day program is available here.

As for the regular program of S4S, the main aim of the Student Day is to show science as an important part of our society, a possible professional career, and a vital human activity. More than 160 SISSA staff, including PhD students, young and senior scientists, laboratory and IT technicians participated in this year's event. The personal interactions with the scientific community during the event helped students see the real-world face of science.

The event was organized by Sissa Medialab with the support of the scientific secretary and the IT staff.

For more detailed information, see the full report available on request.

2.3 SISSA volunteers' recruitment and participation

The previous years' methods and structure were maintained as they proved to be successful. The school visits' program is strongly based on the active participation of SISSA PhD students and post-docs, but also of senior researchers and technical staff. The interaction between SISSA volunteers and school students brought benefits to both sides, as visitors learned more about the life and research topics of scientists, while giving the latter the opportunity to improve their presentation and communication skills, as well as the satisfaction of sharing their passion with a very interested audience.

Sissa Medialab provided continuous organizational support, as well as professional assistance in preparing seminars, activities and supporting materials.

2.4 Products

S4S archive of activities is continuously increasing and several new materials such as activities, seminars, simple experiments, demonstrations, etc. have been added to those created during the previous years (see Appendix 3).

2.5 Main results

S4S – Digital Edition 2020-2021 enjoyed the same success as in previous years, confirming that the way of recruiting visitors and involving them in the proposed activities is very appreciated and fruitful. It also underlines the fact that, even though the program has been moved online due to the COVID-19 emergency, it has not diminished the interest of schools.

Since it worked very well, we kept the same booking procedure used last year for the two registrations. On the 14th of September and on the 28th of November we alerted teachers registered to our mailing-list that the booking would have opened respectively on September 18th and December 3rd at 6:00 pm. On those days a reminder was sent, and the online form was opened. The available slots were filled up in few hours and we received around 150 requests for a total of 150 classes and about 3000 students.

The selection was made based on booking priority, previous participation by the same classes (priority was given to students who have never tooken part in the visits), a balanced participation of different school-types, grades, and geographical regions. It ended up with 30 selected classes and about 515 visitors for the 24 days of visits.

The activities of S4S are distinguished by their inclusive and participatory nature and are considered among international best practices. The success of S4S is due to many factors. First, to the consistency and strength of the message, and to the clear objectives that have been pursued since the beginning (2011). Furthermore, the professionals who run the program have developed specific skills that are almost unique in Italy and give enormous added value. Finally, the relationship of trust that has been built up over the years, both with internal volunteers and with teachers and educators, facilitates management and sometimes makes it possible to expand the fields of intervention to potentially controversial issues. Not to be underestimated are also the absolutely rigorous admission criteria which, in the face of an ever-increasing demand from the public, have never given rise to any complaint.

3. EVALUATION

The evaluation of the school visits' outcome was carried out with teachers and students by collecting data through two main instruments:

1. questionnaires
2. free messages and drawings on a virtual board (Padlet).

The questionnaires were composed by a series of open questions and a quantitative scoring system from 1 (lowest) to 4 (highest) on various aspects of the visits. The scores are:

1 = very bad

2 = not so good

3 = good

4 = very good

A fifth score (corresponding to neither a positive nor a negative evaluation) was deliberately avoided to force polarization of the judgments away from the median.

Qualitative considerations were collected from teachers and students directly during the visit or immediately after, and were always very positive, often enthusiastic. The overall impression is that this experience has been very positive for everybody. The results of the questionnaires confirm this impression.

3.1 S4S – Digital Edition Teachers' evaluation

The questionnaire was sent through a Google Form link to teachers at the end of each visit. Furthermore, the fact that the same teachers booked one or more visits for the next year or have recommended a visit to colleagues in the same institutes, is a clear sign of appreciation which goes far beyond the specific answers to the questions. Very positive were also the evaluations given by many teachers in informal emails after the visits. The questionnaire is presented in the following Box.

EVALUATION QUESTIONNAIRE FOR TEACHERS

Dear teacher,

thank you for having participated to SISSA for Schools Digital Edition. We ask you just a few minutes of your time. This format of S4S is totally new for us and we would like to know what do you think about it. Thank you for your availability.

1. Which program did you take part in?

- Primary School
- Junior high school
- High School

2. Rate from 1 (very bad) to 4 (very good) the following aspects:

- Interest
- Relevance to the school program
- Enjoyment
- Appropriateness to the age and knowledge of the students
- Skill and charisma of SISSA students and speakers
- Interactivity
- Accuracy of the organization

3. What was the best element?

4. What was the worst element?

5. If you already participated to the S4S program, how do you see the comparison between that version and this digital?

6. Would you participate if the visits were in English?

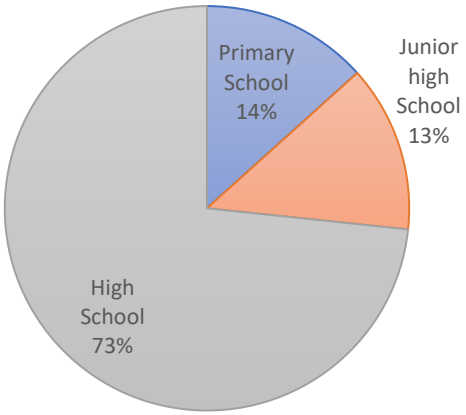
7. Would you involve other classes in this digital version?

8. Suggestions and comments.

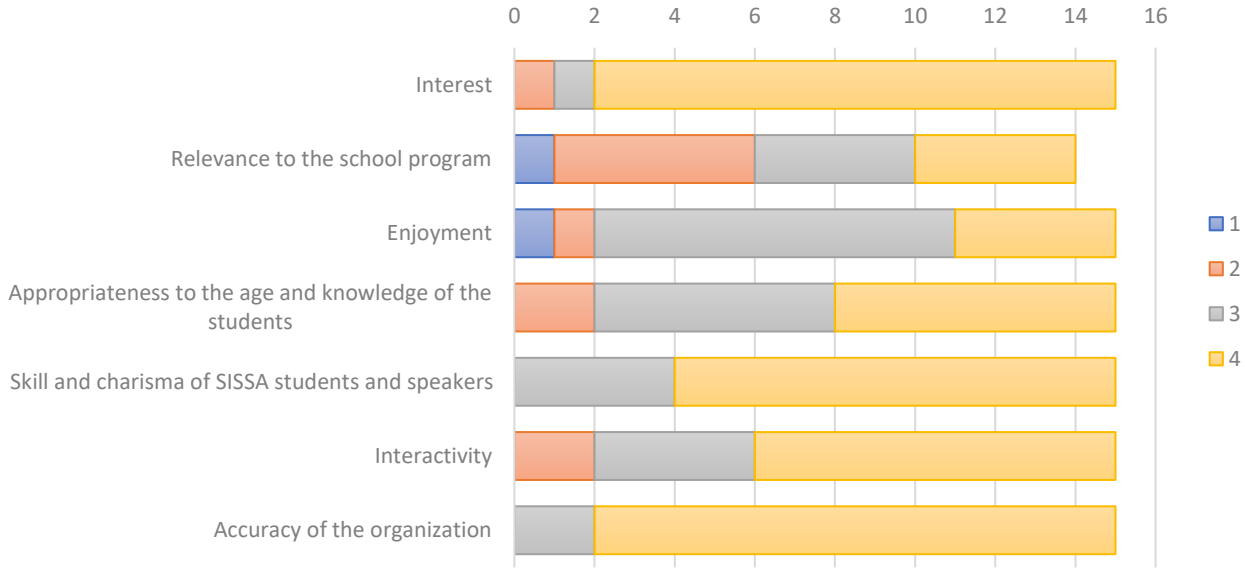
Thank you!

Results

1. Which program did you take part in?



2. Rate from 1 (very bad) to 4 (very good) the following aspects:



	Average rating
Interest	3,8
Relevance to schools' program	2,6
Enjoyment	3,1
Appropriateness to the age and the knowledge of the students	3,3
Skill and charisma of SISSA students	3,7
Interactivity	3,5
Accuracy of the organization	3,9

3. **What was the best element?**

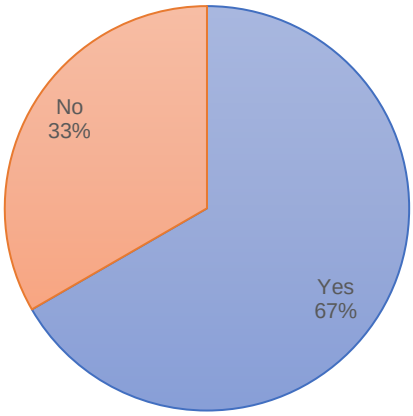
4. **What was the worst element?**

- Solo per non lasciare vuoto il campo: spezzettare anche la seconda parte della presentazione, per dare ai ragazzi il tempo di fare domande, recuperare attenzione ecc. Ma tutto era comunque calibrato bene.
- La lezione non in presenza.
- Tempo ridotto per l'attività sul DNA.
- Ci è mancato il tempo di fare il gioco tutti insieme.
- La presentazione era un po' troppo lunga in considerazione al fatto che i ragazzi di questa età (13-14 anni) hanno tempi di attenzione ridotti.
- L'attività specifica.
- La possibilità di far partecipare un gruppo ristretto di ragazzi.
- La specificità di alcuni passaggi.

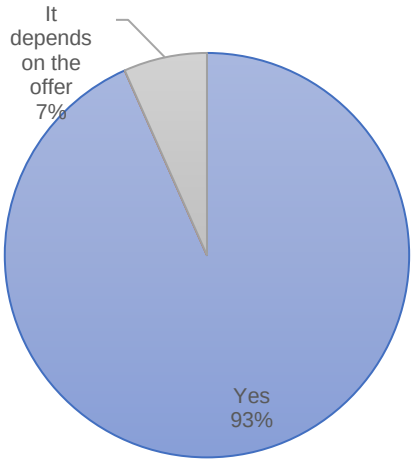
5. **If you already participated to the S4S program, how do you see the comparison between that version and this digital?**

- Non ho termini di confronto.
- Preferisco la lezione in presenza.
- La versione in presenza è migliore (soprattutto per la parte del laboratorio) ma queste videoconferenze virtuali sono comunque interessanti per mettere in relazione i ricercatori con gli studenti e appassionarli allo studio delle scienze.
- Sicuramente anche la versione digitale è un'opportunità, ma non scatta la scintilla.
- L'essere stati lì in presenza è oggettivamente più coinvolgente, però la comodità della versione digitale, soprattutto condotta in un modo così coinvolgente per i ragazzi, ha vantaggi notevoli.
- Rispetto alla versione originale è mancata l'esperienza diretta legata alla visita dei luoghi e degli ambienti della SISSA...ricordo ancora con piacere la vista panoramica dall'aula riunioni e le lavagne sulle terrazze con vista mare.
- Purtroppo, dal vivo è meglio.
- È sempre meglio un'attività in presenza.

6. **Would you participate if the visits were in English?**



7. Would you involve other classes in this digital version?



8. Suggestions and comments.

- Sinceri ringraziamento per l'opportunità e il sostegno.
- Possibilità di mostrare esperimenti a distanza.
- Avete dato tanti spunti di riflessione ai bambini.
- Nelle attività specifiche parlare un po' di più del lavoro di ricerca che si conduce in merito al tema trattato, sia a livello di contenuti, ma soprattutto in riferimento alle modalità.
- Vi ringrazio molto e spero di poter partecipare ancora con le mie classi, sapete tarare molto bene il livello dei ragazzi e complimenti per la capacità di interessarli, divertirli e farli partecipare.
- Nel caso della versione online ampliare il numero massimo dei partecipanti.

3.2 S4S Students' evaluation

Two different types of evaluation were proposed to visiting students: an informal one for primary school children and questionnaires for junior high school and high school.

Primary schools

The main goals we aim to achieve with children through SISSA for schools are:

1. Destroy the stereotype of the scientist: the scientist is usually imagined and drawn by children as a crazy man, often old, who manipulates dangerous chemical substances which explode very easily. Sometimes scientists are considered good, in some cases even superheroes, but sometimes they are perceived as evil characters. The direct contact with real scientists during SISSA for schools seeks to change this stereotype: after the visit children know that scientists are both males and females, they can be young, they are friendly and not crazy. Most of them do not use chemicals, but numbers, graphs, models and computers during their daily routines. For many children being a scientist became a future career possibility.

2. Create positive feelings connected with science: children oftentimes feel uncomfortable when thinking of scientists and places where science is done, such as universities and museums. They feel like such places are dedicated to adults and quite boring.

At the end of the visit, we sent a digital board where children are asked to leave a message or to express their experience in drawings. Figure 2 reports a selection of them.

Table 2 All activities proposed to primary school children in 2019-20

October 29th 2020	Il cervello e la lettura delle parole – Francesca Franzon
November 26th 2020	Leggere e scrivere… DNA – Elena Tea Russo
December 10th 2020	Gatto: solido, liquido o gassoso? – Matteo Becchi
January 21th 2021	Il cervello e la lettura delle parole – Francesca Franzon
March 4th 2021	Gatto: solido, liquido o gassoso? – Matteo Becchi
March 25th 2021	Do-Re-Matematica, il suono della geometria – Maria Strazzullo
May 20th 2021	Il cervello e la lettura delle parole – Francesca Franzon
May 27th 2021	Do-Re-Matematica, il suono della geometria – Maria Strazzullo

Some teachers returned us feedback from their students regarding the experience:

Do - Re - Matematica, il suono della geometria

Cosa può avere a che fare una composizione musicale con triangoli, quadrati e cerchi? Può essere la matematica entusiasmante e perfino divertente? L'esperienza che ci avete proposto ci ha definitivamente convinti/e che la matematica è bellissima.
Grazie SISSA! *Le ragazze e i ragazzi della 5 B della scuola Visintini*

Gatto: solido, liquido o gassoso?

Quando si dice sgretolare una certezza, grazie al vostro meraviglioso viaggio nella materia abbiamo capito che i confini fra i diversi stati sono molto sottili! Simpatica anche l'idea di presentare la ricerca anche nei risvolti più originali! In classe continua il dibattito sui gatti! Insomma, avete senza dubbio stuzzicato la curiosità dei bambini...

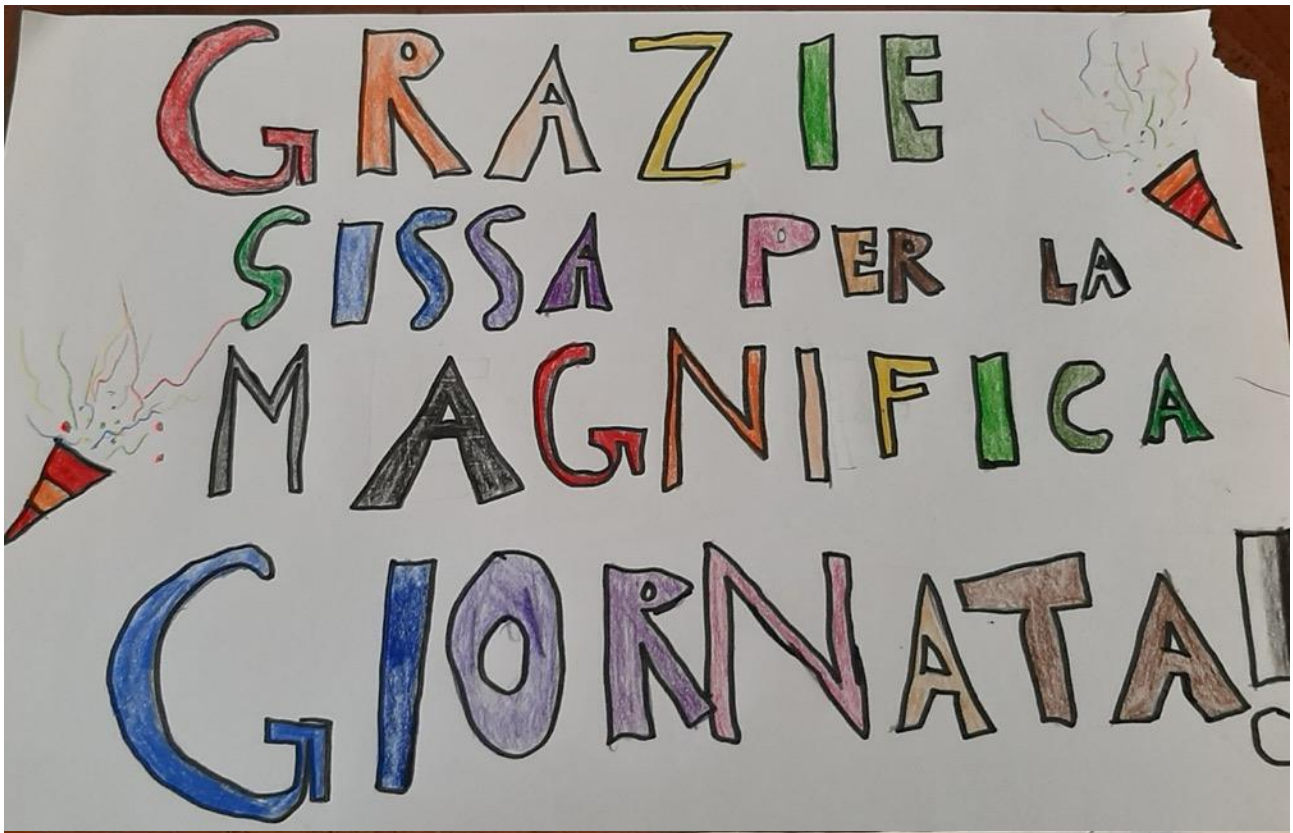
Il cervello e la lettura delle parole

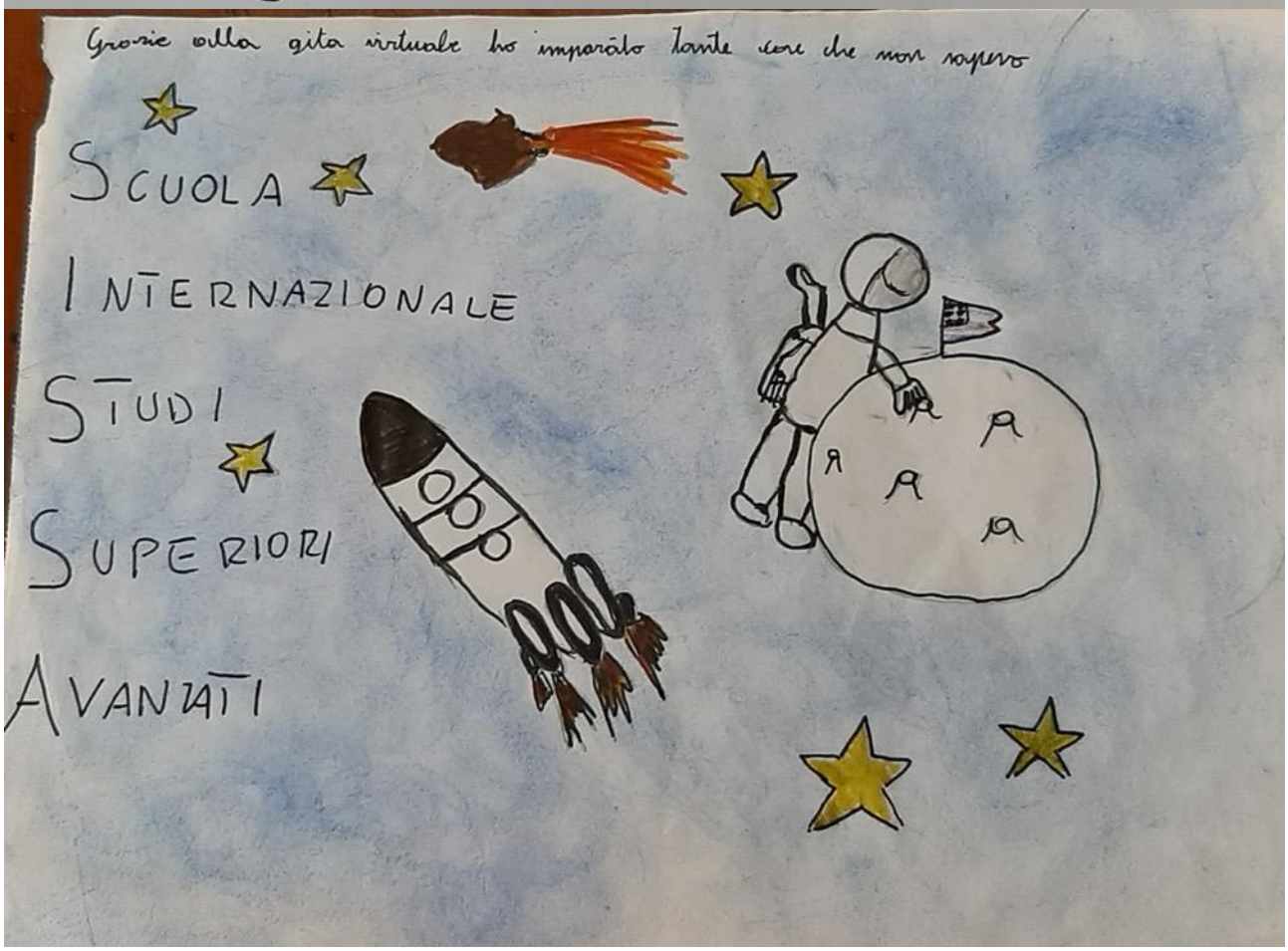
Ecco i contributi dei bambini della *classe 3C della Scuola Elementare Duca d'Aosta di Trieste*. Come potete vedere tutti i bambini hanno davvero apprezzato le attività che avete proposto: dall'incontro con i ricercatori al gioco delle parole. Nonostante la distanza fisica, i bambini si sono sentiti davvero coinvolti! Riporto alcune delle domande e delle osservazioni formulate dai bambini poiché esse testimoniano l'acutezza delle loro

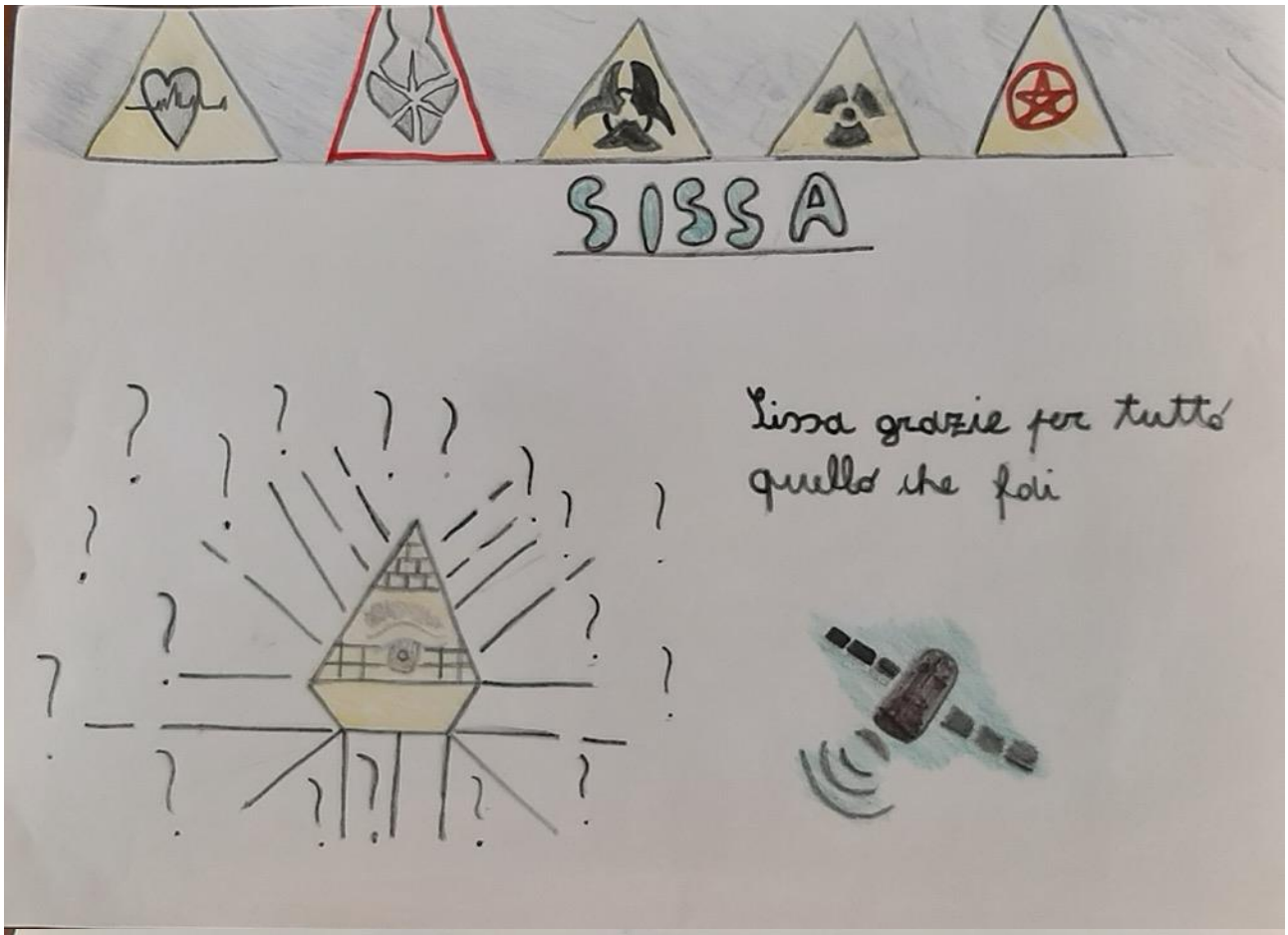
osservazioni. “Che cos’è un buco nero?”, “Gli alieni esistono davvero?”, “Com’è avvenuto il Big Bang?” “Le parole che si ricordano meglio sono quelle che si usano di più.” “Secondo me si ricordano di più le parole più corte rispetto a quelle più lunghe”.

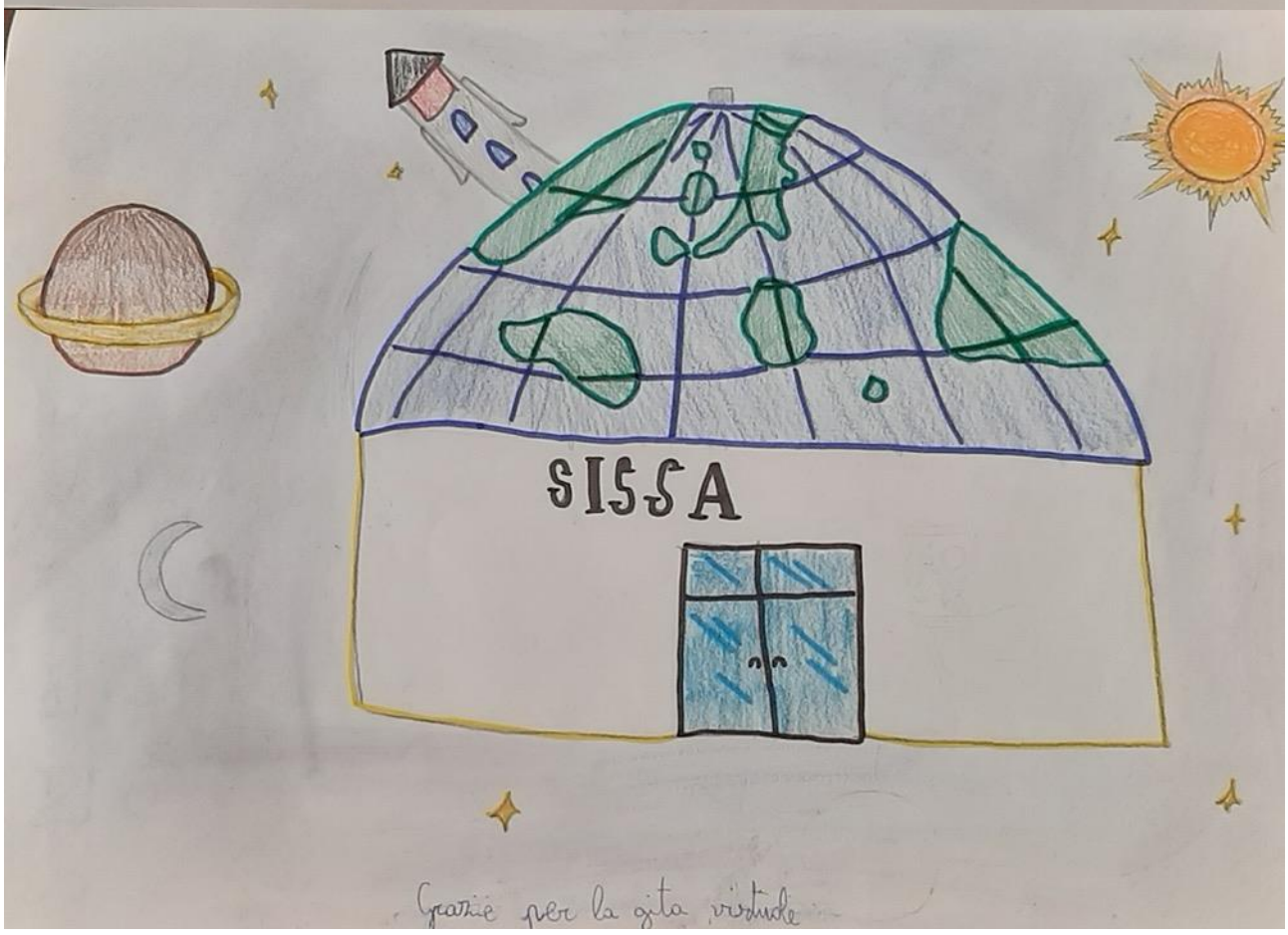
Il cervello e la lettura delle parole

I bambini e le insegnanti ringraziano per questa opportunità offerta nonostante la situazione pandemia: cogliere i lati positivi del caso facendo una gita virtuale è stata un'idea super e, comunque, le attività sono state ben studiate e pensate come sempre quindi il risultato è stata un'esperienza divertente e coinvolgente grazie "ALL'INDOVINA CHI?" dove la conversazione con gli esperti e le loro spiegazioni tecniche ma adatte all'età hanno scatenato un'infinità di domande... e al gioco a squadre che ha reso l'attività ancora più VIVA e le domande sempre più fiorenti! I disegni ne sono la prova! *Classe IV A, Primaria Longo*


GRAZIE
SISSA PER LA
MAGNIFICA
GIORNATA!


Grazie alla gita virtuale ho imparato tante cose che non sapevo
SCUOLA
INTERNAZIONALE
STUDI
SUPERIORI
AVANZATI


SISSA
Sissa grazie per tutto quello che fai


SISSA
Grazie per la gita virtuale


GRAZIE PER LA GITA VIRTUALE.
S.I.S.S.A


SCIENZA
ATOMI
SPAZIO
NEURONI
S.I.S.S.A.
CERVELLO
AVANZATI
CELLULE
CORPO
GALASSIA
SUPERIORE
SPAZIO
ATMOSFERA
MOLECOLE
GRAVITÀ
BRAIN
CHIMICA
STUDI
STELLE
INTERNAZIONALE
UOMO
TERRA
SCUOLA
Grazie alla Sissa per la gita virtuale

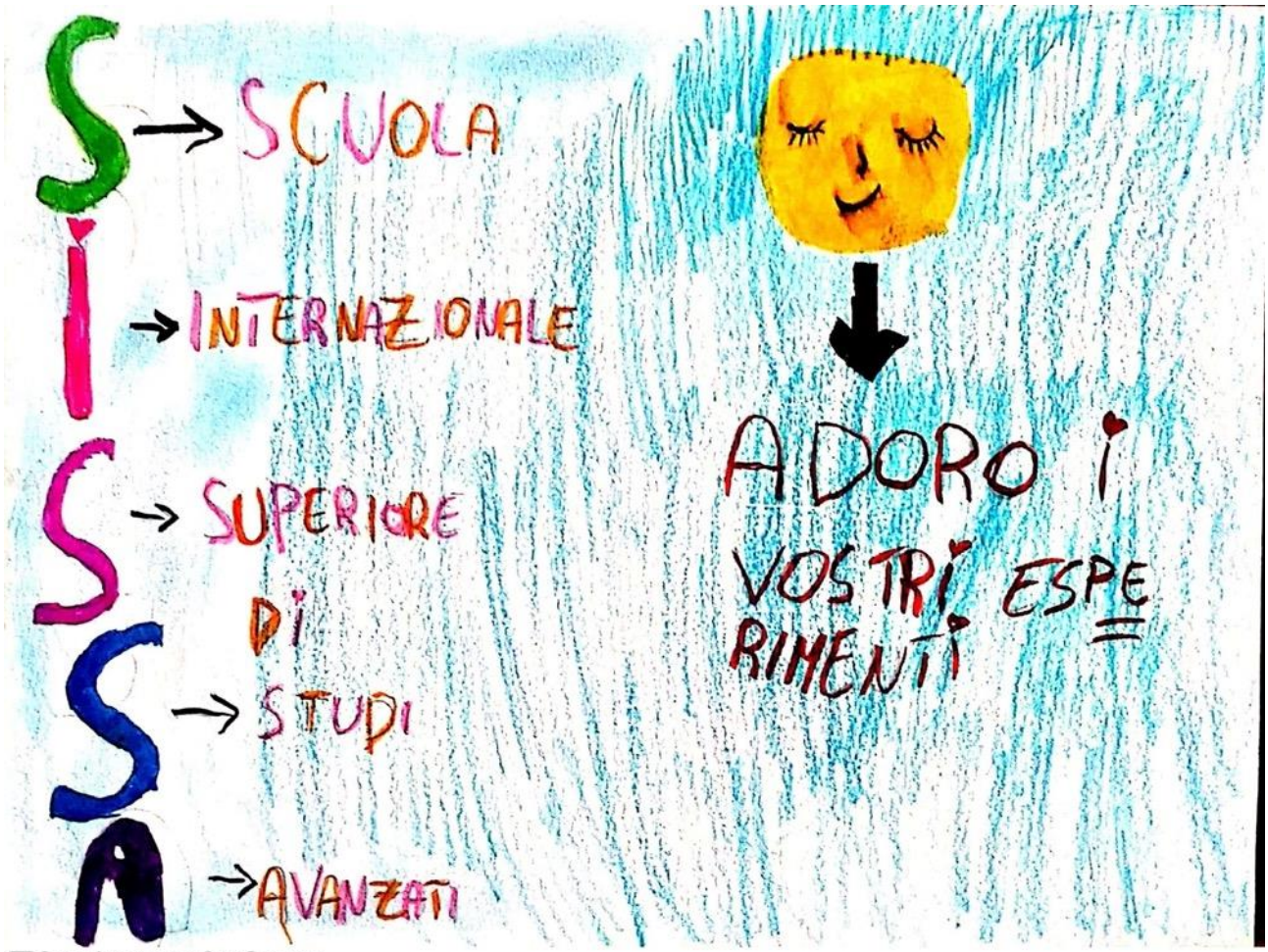

Zoom
L.I.M.
S.I.S.S.A.
Sissa
GRAZIE
S.I.S.S.A.
S.I.S.S.A.

GRAZIE SISSA!

VI RINGRAZIAMO PER TUTTE LE ATTIVITÀ FATTE PERCHÈ ERANO BELLISSIME, DIVERTENTI ED EDUCATIVE

Noemi Ricardi - 5A "FRATELLI VISINTINI"

IL GATTO È LIQUIDO, SOLIDO O GASSOSO?




SISSA
SCUOLA INTERNAZIONALE SUPERIORE DI STUDI AVANZATI
MARISTELLA TRAMPUS

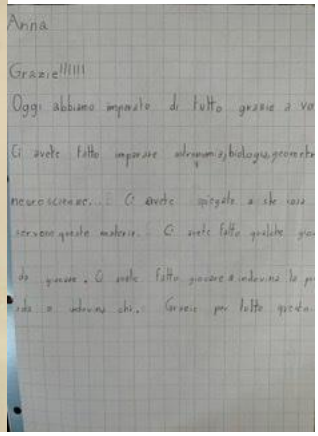


Figure 2: Selection of drawings and messages received from primary school children.

Junior high schools and high schools

The questionnaires were made available through a Google Form. The questionnaire for students was composed as in the following BOX.

EVALUATION QUESTIONNAIRE FOR STUDENTS

Dear student,

thank you for having participated to SISSA for Schools Digital Edition. We ask you just a few minutes of your time to help us to improve it. Thank you for your availability.

1. Which program did you take part in?

□ Junior high schools

□ High schools

2. Rate from 1 (very bad) to 4 (very good) the following aspects:

- Activity
- Interaction with the researcher
- "Guess who – Sissa Edition"
- Skill and charisma of SISSA students and speakers
- Interest
- Enjoyment
- I learned new things
- It made me want to learn more about science

3. What was the thing you liked the most?

4. What was the thing you liked the least?

5. Would you like to repeat this experience with other researchers?

6. Did you use a smartphone to participate?

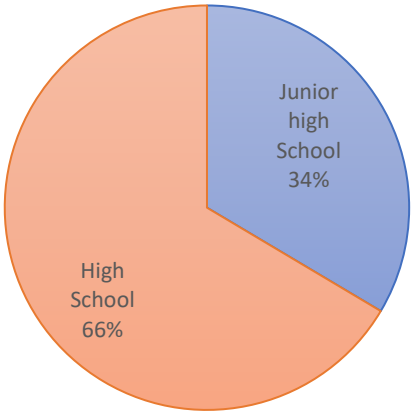
7. Are you willing to participate to meetings in English?

8. Suggestions and comments.

Thank you!

Results

1. Which program did you take part in?



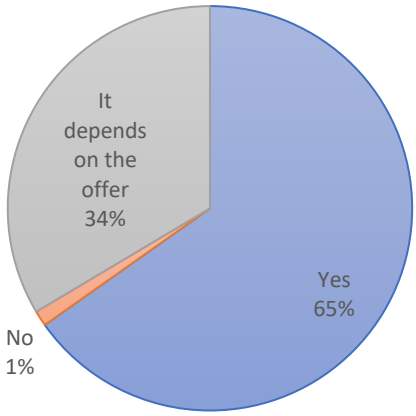
2. Rate from 1 (very bad) to 4 (very good) the following aspects:

	1	2	3	4	# participants	Average rating
Activity	2	15	82	62	161	**3,3**
Interaction with the researcher	0	27	72	62	161	**3,2**
"Guess who – Sissa Edition"	4	15	60	82	161	**3,4**
Skill and charisma of SISSA students and speakers	0	5	50	106	161	**3,6**
Interest	1	18	77	65	161	**3,3**
Enjoyment	1	44	74	42	161	**3,0**
I learned new things	0	13	65	83	161	**3,4**
It made me want to learn more about science	7	69	52	33	161	**2,7**

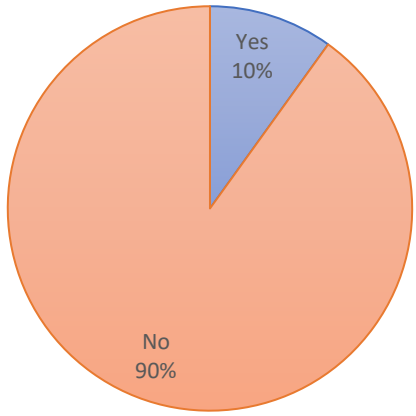
3. What was the thing you liked the most?

4. What was the thing you liked the least?

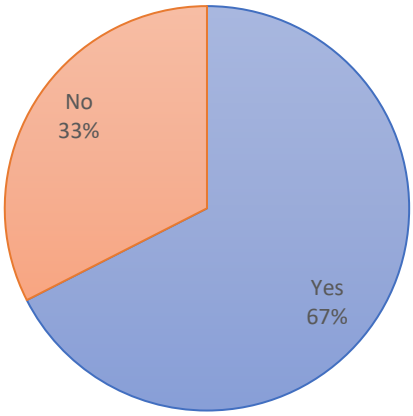
5. Would you like to repeat this experience with other researchers?



6. Did you use a smartphone to participate?



7. Are you willing to participate to meetings in English?



8. Suggestions and comments

- Dare meno cose per scontato, rendere la presentazione finale più beve.
- Mi dispiace averla fatta in dad.
- È stata l'esperienza a scuola in cui l'abbiamo fatto virtualmente soprattutto voi che avete dato delle ore per noi vi ringrazio.
- È stata un'attività molto interessante.
- Secondo me durante la spiegazione sarebbe più semplice con dei paragoni o con delle immagini. Siete stati molto bravi.
- Tutti erano molto bravi e simpatici.
- Molto interessante, specialmente la parte di neurobiologia.
- Estremamente interessante. Mi piacerebbe ci fossero più incontri come questo.
- Sarei stato maggiormente coinvolto in una lezione meno teorica e più esemplificativa, che magari spaziasse su più temi piuttosto che uno solo.
- Credo che in generale era già una bellissima attività e i cambiamenti sarebbero solo di tipo personali, farei incontri su argomenti meno 'pesanti' tipo la matematica.
- Si potrebbe dare spazio anche a più di una delle discipline che vengono menzionate. Non sempre si ha il tempo e la disponibilità per farlo, ma potrebbe essere un'esperienza ancora più piacevole.
- Mi dispiace che l'interazione con noi studenti sia stata scarsa ma la distanza non permette la stessa modalità di relazione che ci sarebbe potuta essere presenza.
- Di porre qualche pausa o momento interattivo durante la ricerca del relatore.
- Ho trovato questa attività interessante, piacevole, divertente e formativa.
- Proporrei di accorciare il tempo dell'attività o introdurre una pausa per staccare 10 minuti e riprendere la concentrazione.
- Non ho suggerimenti. Ho trovato questo incontro molto interessante, partecipativo e coinvolgente.
- È stato molto interessante e coinvolgente.
- Sarebbe molto bello vedere la Sissa dalla realtà, perché io non ci sono mai andata in gita a differenza di altri miei compagni, e scienze (con tutte le sue branche) è la mia materia preferita, infatti io vorrei studiare medicina (perché il mio intento è fare veterinaria, ma credo che per specializzarsi in questo, la medicine è la base al mio scopo).
- Avrei parlato di un argomento per campo 1 neurologia, 1 statistica (brevemente) ecc...
- Lasciare più spazio agli studenti piuttosto che ai professori, essendo i docenti meno vicino ai maturandi come età e come modo di pensare.
- È stata una bellissima esperienza e soprattutto molto interessante.
- Lezione davvero bella e interessante.
- È stata una bellissima esperienza e mi piacerebbe riviverla anche di persona.
- Forse alla fine del gioco "I soliti ignoti-Edizione SISSA" quando ogni persona parlava del proprio lavoro, io avrei cambiato un po' l'esposizione perché certi concetti erano un po' difficili da capire come per esempio quello della FISICA ALLO STATO SOLIDO.
- Sono stati molto bravi ed è stato molto educativo e divertente, mi è piaciuta molto questa lezione.

We also received some messages from junior high school students:

Filippo (I.C. San Giovanni, Trieste)

La **SISSA** (Scuola Internazionale Superiore Studi Avanzati) è un istituto di alta formazione dottorale italiano, a statuto speciale, situato a Trieste. Vi si può accedere dopo aver completato il percorso scolastico completo (scuola materna, scuola primaria, scuola secondaria di I grado e scuola secondaria di II grado). Fondata nel 1978, questa università ha tre aree scientifiche tra cui scegliere il proprio percorso di studi: **FISICA**, **MATEMATICA** e **NEUROSCIENZE**.

Situata a cinque chilometri dal centro di Trieste in prossimità della frazione di Opicina, occupa gli edifici ed il parco che ospitavano il complesso del sanatorio dedicato a Santorio, sul pendio che porta all'altopiano carsico. La SISSA propone ai ragazzi della scuola un nuovo progetto denominato **"SISSA FOR SCHOOLS"**, grazie alla collaborazione di giovani studenti e collaboratori (nel nostro caso Valentina), con lo scopo di proporre ai ragazzi delle attività informative e divertenti per far conoscere la SISSA. Teoricamente questo progetto si sarebbe dovuto fare in presenza nella sede della SISSA, ma viste le normative legate al COVID-19 quest'anno si fa come attività a distanza (in DAD). La nostra classe ha partecipato a questo progetto il giorno giovedì 29 ottobre. Nonostante il fatto che il progetto sia stato presentato a noi ragazzi tramite power point e presentazione online, credo che tutta la mia classe si sia divertita a scoprire cose nuove ed a conoscere come funziona e come è strutturata la Sissa. Il progetto era organizzato nel seguente modo: per prima cosa abbiamo conosciuto alcuni membri (collaboratori) di questa università tramite un gioco simile ad "Indovina chi'", scoprendo pure le materie studiate dai diversi collaboratori. Successivamente abbiamo fatto conoscenza con Beatrice (neurologa), la quale ci ha fatto una lezione molto interessante sulle **cellule** e sui **neuroni**, condividendo un power point che ha creato lei. Beatrice ci ha illustrato quante cellule abbiamo nel nostro corpo, ossia circa 30.000- 100.000 miliardi; ci ha parlato delle colture cellulari, di come far sopravvivere le cellule al di fuori di un essere vivente, tramite capsule Petri, fiaschette, piastre multipozzetto e tubi con dovute temperature (37 gradi), in ambienti umidi e permettendo il passaggio di gas.

Grazie a questa lezione, ho scoperto cos'è l'**ippocampo**, ossia la parte del cervello che è la sede della memoria, un organismo che viene studiato tramite il microscopio, tagliato in 6 parti uguali e messo in capsule Petri per osservarlo. Beatrice inoltre ci ha mostrato, tramite delle immagini, cosa si vede dentro il microscopio, parlandoci delle cellule che compongono l'ippocampo, ossia i neuroni, come si evolvono i neuroni e tante altre cose interessanti.

Ringrazio di cuore la SISSA, Valentina, Beatrice e tutti gli altri collaboratori di questo progetto: mi hanno fatto conoscere molte cose nuove, coinvolgendo noi ragazzi con passione ed entusiasmo e riuscendo, anche se a distanza, a trasmetterci tante informazioni che saranno utili nel nostro percorso scolastico.

Infine, grazie anche al prof. Bon che ci ha permesso di vivere questa bellissima esperienza!!!

Complimenti ai ragazzi e alle ragazze della Sissa :-)

Giacomo (I.C. San Giovanni, Trieste)

Giovedì 19 novembre 2020 abbiamo fatto una videoconferenza con dei ricercatori della Sissa (Scuola Internazionale Superiore Studi Avanzati) di Trieste. Il Direttore della Sissa è il professore Stefano Ruffo, che è anche un fisico. Nella Sissa si parla inglese perché i ricercatori che ci lavorano provengono da tanti parti del mondo essendo un centro molto prestigioso. Per capire come arrivare alla Sissa ci hanno parlato del percorso scolastico in generale: si parte dalla scuola dell'infanzia che dà delle basi soprattutto pratiche, poi c'è la scuola primaria che insegna a scrivere, a leggere e a fare i calcoli; si passa a questo punto alla scuola secondaria di primo grado (che sto frequentando) dove si imparano cose più difficili, per arrivare infine alla scuola secondaria di secondo grado: qui si arriva ad una prima specializzazione. Se si vuole proseguire si va all'Università dove si fa una scelta ben specifica sulle materie che si vogliono studiare per arrivare alla laurea; volendo si può ancora continuare per arrivare al dottorato. Nella Sissa si studia la fisica, con sette specializzazioni, la matematica, con due specializzazioni, e le neuroscienze, con quattro specializzazioni. I quattro ricercatori ci davano degli indizi per cercare di indovinare in quale materia essi erano specializzati: purtroppo non siamo riusciti ad indovinare però alla fine ci hanno detto lo stesso che erano studiosi di fisica computazionale, astrofisica e cosmologia, fisica dello stato solido e cosmologia. Ci hanno spiegato poi in che cosa consistono queste materie:

- fisica computazionale: si occupa di simulare le molecole virtualmente, per questo serve conoscere anche un po' di informatica; è utile in cucina.

- astrofisica e cosmologia: studia i segnali di radiazione e come si è evoluto l'universo dopo il Big Bang; studia anche le microonde usando programmi informatici

- fisica dello stato solido: riguarda lo studio delle proprietà dei solidi.

- cosmologia: è la scienza che studia il cosmo e la realtà, non conosciamo tutto ciò che c'è nel cosmo; una cosa che non conosciamo è la materia oscura. I computer ci aiutano ad individuare più galassie: lì c'è la materia oscura.

Abbiamo parlato un po' dell'universo e della sua origine. Ci sono due opinioni sulla nascita dell'universo: la prima è che sia sempre esistito, la seconda è che si sia formato dopo il Big Bang; subito dopo l'esplosione l'universo era caldo, poi si è raffreddato. La radiazione cosmica di fondo è visibile quando non c'è segnale e si vede tutto bianco e nero a puntini, come quando la TV non prende.

Il buco nero è un corpo celeste che non si riesce a vedere, si individua grazie ad un cerchio di polvere rossa/arancione che lo circonda e lo delimita. Non è possibile uscire da un buco nero perché è molto compatto: neanche la luce riesce ad uscire. quando un corpo entra nel buco nero succede il fenomeno della spaghettificazione: la forza del buco nero "restringe" il corpo e lo allunga risucchiandolo.

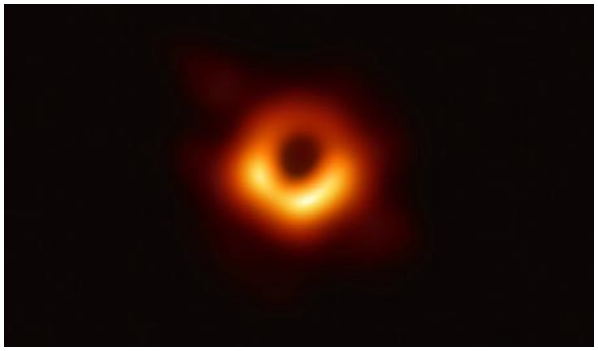


Figure 3 Buco nero

Un mio compagno di classe ha chiesto quante galassie ci sono nell'universo e la risposta del ricercatore mi ha colpito molto: centinaia di migliaia. Ci hanno parlato anche delle stelle: le stelle, in realtà, hanno tanti colori sovrapposti; contando tutte le stelle e facendo una media dei vari colori è venuto fuori che il colore che compare di più è simile a quello della schiuma del cappuccino.

Sopra Saturno, il pianeta che tutti conosciamo per i suoi anelli, c'è un esagono grande come la Terra costituito da polveri che si sono accumulate nel corso dei millenni. Una ricercatrice di nome Jocelyn Bell mentre osservava l'universo scoprì un ritmo che proveniva da una stella: all'inizio annunciò che il ritmo era provocato da degli alieni. In realtà aveva scoperto una pulsar: una stella di neutroni che quando si forma ruota molto velocemente. Questa scoperta vince il Premio Nobel, però il premio non andò a Jocelyn Bell ma al suo capo e al suo collega. Questa storia mi ha incuriosito, infatti ho chiesto ai ricercatori se c'è rivalità tra i vari studiosi nel mondo: mi hanno risposto che dipende, alcuni sono più competitivi e altri meno. Adesso però grazie alle conferenze e ai confronti tra studiosi si scopre facilmente chi è il vero ideatore di una teoria.

La videoconferenza mi è piaciuta molto perché ho imparato delle cose nuove, i quiz che ci hanno fatto erano molto divertenti e mi hanno fatto venire ancora più voglia di diventare fisico: uno dei miei sogni infatti è vincere il premio Nobel per la fisica.

Corrado, (I.C. Iqbal Masih)

Relazione sulla videoconferenza sulla coltura cellulare di cellule neurali e sui corsi di studio possibili alla SISSA. Gli argomenti sono stati presentati bene e, nonostante l'impossibilità di essere presenti causata dal COVID-19, i video hanno reso la presentazione interessante. La classe ha preferito di gran lunga le attività interattive, che erano molto ben strutturate. Ha trovato invece difficili da seguire le altre attività/presentazioni, soprattutto quelle più tecniche e con terminologie più difficili, in particolare quella sulle cellule tumorali e sull'immortalizzazione dei gruppi di cellule. Credo che, come è stato già in parte fatto, dare la possibilità di

porre delle domande dopo alcuni degli argomenti potrebbe aiutare molto. Naturalmente la valutazione del tutto dipende anche dai singoli alunni, quindi dirò anche ciò che a me personalmente è sembrato più interessante. La prima parte, nella quale ci chiedevano di indovinare chi faceva cosa, è stata molto interessante, come tutto il resto di questa parte. La parte delle cellule tumorali è stata a tratti molto pesante, anche se ben gestita. La coltura delle cellule, è stata molto interessante, le domande hanno ravvivato la mia attenzione, preparandomi per il prossimo argomento, e, anche come è stata spiegata mi ha reso molto più facile seguire. L'immortalizzazione dei gruppi di cellule, è stata sul momento interessante, ma se ora ci ripenso, vedo solo la curva che dice quante cellule ci sono alzarsi, mi ricordo che c'entrano i tumori, ma non so ben collegare gli effetti, senza dedurre un po' di cose. La legge sulla tutela degli animali, infine, è stata pure essa molto interessante, e mi ha fatto pensare di come sia importante il rispetto per gli animali, anche se non ricordo se gli animali muoiono dopo aver subito un operato chirurgico al cervello (spero di sì).

La videoconferenza mi è piaciuta, e credo che investirci su potrà convincere le future generazioni a imbracciare la scienza.

Cordiali saluti

Corrado

3.3 S4S – SISSA volunteers' contribution

This year, the volunteers' evaluation was carried out under the following forms: interview and short messages from volunteers.

Volunteers in-depth interviews

Name and surname: Michele Giugliano
Field: Neuroscience
Position: Researcher

When did you join S4S?

I joined in early 2020, few months after accepting an academic position at SISSA, after 18 years spent abroad.

Why did you join S4S?

I believe it is my duty and responsibility to give back to the community what I received during my academic training and professional trajectory. In particular, since 2006 my research has been largely funded by the European Commission, therefore by taxpayer's money. I am strongly convinced that part of my mission is to give back to the civil society, disseminating and popularizing the discoveries and my own scientific contributions.

What did you do?

I volunteered to meet secondary school students (i.e. "live" in early 2020, "online" during 2021) and offer an informal overview of my study career in Italy and abroad, also through a brief seminar on the most intriguing aspects of my own research in neurobiology.

Was the experience what you expected?

Yes. While abroad, I had been previously involved in dissemination and popularization initiatives and I was aware of the challenges of public speaking to a lay audience. During the 2021 edition of S4S, the "online-only" nature of the initiative did not fully allow interactions with the students. Nonetheless, I have been contacted via email by some of them, after my talk and I offered to host one of them in my lab for the high-school compulsory internship.

Do you think it has been useful for you and your career?

Yes, it has been a very useful training opportunity to do public speaking and receiving competent feedback by the S4S organisers. Developing a sensitivity that science and academic research cannot be a "ivory tower"

endeavor, and that it must involve citizens and students, is pivotal for the career of any researcher today. Specifically, this is a key asset in terms of being successful to attract funding, being able to demonstrate excellence in both science and in public dissemination.

Do you think S4S is important for SISSA?

It is essential to fulfill the role of SISSA in our society and to inspire new generation of researchers who, one day, will work here. I am shocked that only few established colleagues of mine respond with enthusiasm to S4S. I have explained it to myself with the hard time we all experienced because of the pandemic emergency.

What would you say to someone to invite him/her to join?

Participating to S4S and similar initiatives is an integral part of the so-called “third-mission”. Giving back to the society and making oneself available to inspire young students should be compulsory.

Did it take up a lot of time?

Time is never wasted when it represents an opportunity to grow as a researcher and as a person. It took less than 3h throughout several weeks.

Some people say they can’t join because they do not have time, what do you think about that?

You cannot “find the time”. Instead, you must “reserve time” and “put time aside” for what you think resonates with your inner values. If guiding and inspiring the new generation of researchers is not among your values, you must remember your own personal history and how a few meetings, events, or experiences determined your career and who you are.

This year you participated at the new version of S4S, “S4S Digital Edition”. Did you like it? What was the best element? And what was the worst one?

Online conferencing is, like it or not, here to stay beyond the pandemic. It is simple and allows one to “save time” and reach more effectively a large® audience. It has the disadvantage of not fully engaging the audience, in the same way a “live” talk can. Visits to laboratories cannot however be “rendered” through an online medium, but videos and blended learning tools can be complementary and very useful tools to disseminate science.

Do you have any comment/suggestion?

SISSA and its new Director should invest more financial resources to support S4S staff and allow them to blossom and grow even more. Long-term priorities to further consolidate, nationally and internationally, the good reputation for SISSA outside the “ivory towers” of academia, should start now: it is one of the best investments in the future we can think of.

Comments from volunteers

“I Despite the hard times that we have faced in 2020/2021, which forced us to move online much of our daily life, I am happy that I had the opportunity to participate in S4S from as far (currently I live in Germany) as a SISSA ex-alumno. I had fun with the activity and I was glad to see the interest of the young generations in our activities and science.” – *Alessio Belenchia* – from the Alumni association

" There are two aspects of S4S that are the most significant to me. The first one is that having to explain scientific concepts to kids I am forced to make them very clear and simple, and this helps my understanding of things a lot. Once you have done the effort to explain something to the kids, it's much easier to explain it to other people, at every level. The second one is that the enthusiasm shown by the kids is priceless. They ask tons of questions (sometimes, quite unrelated to the topic you are talking about...), and it's very nice to do something, however small, to encourage their curiosity." – *Matteo Becchi*

“I just participated in the activities with small children, and I really enjoyed it, they look so curious about everything we say! It is great that S4S is run by women and there are many women volunteering, so young children might grow a small step away from the bias which influence our work as researchers in science.” – *Annamaria Ortu*

“My first experience with S4S was very inspiring. Being able to explain an abstract concept of mathematics to high school students with simple words allowed me to see that topic from various points of view. It was also very nice to be able to tell them my university experience, hoping that it will be helpful for someone.” – *Nicholas Rungi*

“My first experience with S4S was a great pleasure! As a researcher that reaches out to schools a lot, I know well the challenge of saying complex things in simple words as well as the logistics and the organization challenge. I always felt the need for this important figure that would support me while assessing these two challenges. The S4S was a great discovery for me, as they provided exactly the support I needed so much! Their activity with games followed by a scientific seminar worked super well to first engage the students and then nurture their curiosity. Surely whatever good project works only thanks to the people, S4S is a great team of enthusiastic and competent people who are always available to assist. It is a big fortune to have them here in Trieste! In my dream, a project like this would exist at least in every region and would give an opportunity to all researchers of the area to talk about their research” – *Oxana Mishina*

“This Sissa for schools year was quite an emotional one. Indeed, it is my last year in SISSA and I will miss so much being a volunteer. In the beginning, I was a bit skeptical and doubtful: how much time will I lose for my research? Will I be good at that? But after these years I can surely state that the SISSA for schools project helped me grow as a person and as a scientist. It is impressive to see how we as students have such an impact on young minds and such a social responsibility and I assure you that this experience will make your day better!” – *Maria Strazzullo.*

4. GENDER BALANCE

A key goal for scientific outreach, and thus for the program S4S, is to foster gender equality and inclusion in scientific research, where women and minorities are traditionally less represented. Therefore, a specific effort has been carried out since the origin of SISSA for Schools in presenting scientists in the least stereotypical way possible. Facilitators take great care to use gender-neutral and inclusive language to present scientists and scientific careers and to favour a diverse community of volunteers.

Although no formal measures have been applied to force a precise balance, in order not to limit volunteer's freedom to be involved according to their personal desires and constraints, the inclusiveness of the community has so far ensured a very **good level of gender** balance (see next section).

This is very impressive because volunteers mostly belong to SISSA's research community, which is heavily biased: women are only 12% among professors and researchers and 26% among students, according to the 2019 SISSA CUG report.

4.1 Gender equality: numbers and time evaluation

We analyze here the gender distribution in the most prominent role of SISSA for schools: speakers, those who give the major contribution to the school visits and accompany classes for a big part of the morning in SISSA.

We are going to analyze two quantities:

- the percentage of female speakers in the speaker pool. Repeated contributions from a single speaker will not affect this variable.
- the percentage of female speakers in the annual school visit calendar. In other words, this represents how often the speaker in front of a random pupil at S4S is a woman. Repeated contributions by a speaker will modify this variable.

The former is a measure of gender equality in the volunteer pool, the latter quantifies how the "image" received by guest pupils is skewed toward one gender or the other. This last quantity is, then, the one which is of primary interest to impact on gender stereotypes on scientific careers.

We have studied the evolution of these quantities between 2014 and 2021: data are reported in Figure 3 and Table 3.

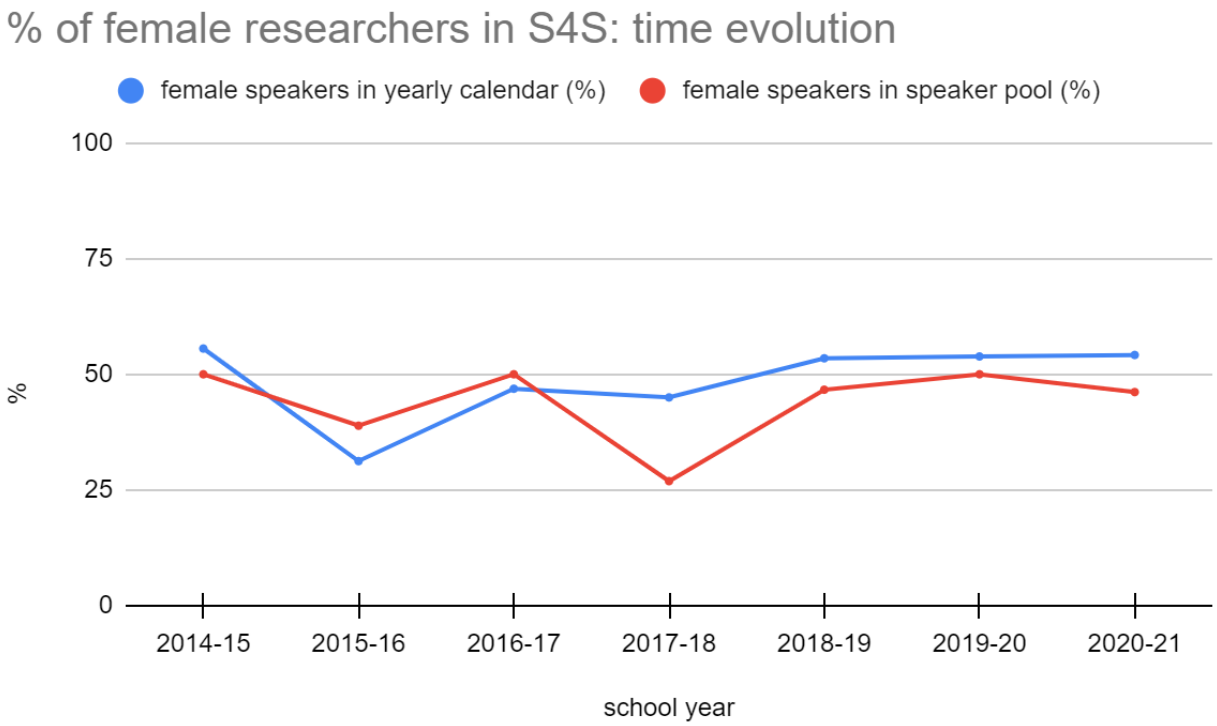


Figure 3: Percentage of female speakers in speaker pool (in red) and percentage of female speakers in the annual school visit calendar (in blue) for the program SISSA for Schools between 2014 and 2021.

School year	Occurrence of female speakers in the annual school visit calendar	Occurrence of male speakers in the annual school visit calendar	Total female speakers	Total male speakers
2014-15	25	20	10	10
2015-16	15	33	7	11
2016-17	15	17	9	9
2017-18	18	22	7	19
2018-19	31	27	14	16
2019-20	14	12	9	9
2020-21	13	11	6	7

Table 3: Absolute numbers of speakers per gender in the annual school visit calendar and in the pool of speakers.

Figure 3 shows that, since the beginning of the program and with general stability, participants to the S4S program interact with speakers who are approximately 50% of the time male and 50% of the time female, with a single significant deviation in 2015-16.

Moreover, volunteer speakers are slightly more often male than female, but still significantly more balanced than the average research population in SISSA.

APPENDIXES

APPENDIX 1. SISSA FOR SCHOOLS CALENDAR 2020-2021

Date	School	City	Type of school	Class	Students
OCTOBER 2020					
29	IC San Giovanni	Trieste	Junior high schools	2 B	20
NOVEMBER 2020					
5	Duca D'Aosta	Trieste	Primary school	3 C	23
12	Istituto Volta	Trieste	High school	3 C	19
19	IC San Giovanni	Trieste	Junior High school	1 B	18
26	IC Marco Pole	Trieste	Primary school	4 B	24
DECEMBER 2020					
3	Istituto Volta	Trieste	High school	4 F	14
10	Duca D'Aosta	Trieste	Primary school	4 C	17
JANUARY 2021					
14	I.C. "Iqbal Masih"	Trieste	Junior high school	3 C	19
21	IC Svevo	Trieste	Primary school	2 D	15
28	ISIS Stefan	Trieste	High school	Mix of 1	30
FEBRUARY 2021					
11	Istituto Volta	Trieste	High school	3 F	25
18	Liceo classico Uccellis	Udine	High school	5 A	27
25	STUDENT DAY				
MARCH 2021					
4	I.C. Roli	Trieste	Primary school	5 A	20
11	I.C. Pertini	Torino	Junior High school	1 E	16
18	Liceo Classico Uccellis	Udine	High school	4 A	35
25	I.C. Roli	Trieste	Primary school	5 B	20
APRIL 2021					
8	Liceo Scientifico Einstein	Cervignano	High school	3 LSAE	17

15	Addobati	Trieste	Junior High School	2 C	23
22	IIS Leopardi-Majorana	Pordenone	High school	4 A	25
29	Sacro Cuore	Modena	High school	5 A	31
MAY 2021					
6	Codermatz	Trieste	Junior High School	3 B	20
11	Volta	Trieste	High School	4 F	14
20	I.C Commerciale Longo	Trieste	Primary school	4 A	25
27	De Amicis, IC Lucio	Trieste	Primary School	3 C	18

APPENDIX 2. ACTIVITIES PROPOSED FROM THE BEGINNING OF THE PROGRAM

School level	Area	Topic	Speaker
PRIMARY SCHOOLS (listed according to school year)			
I and II school years	Neuroscience	*The chemical senses: smell and taste*	Simone Pifferi and Gianluca Pietra
I-V school years	Neuroscience	*Watch out your nose!*	Emilio Agostinelli and Domenico Guarascio
	Physics	*Riding the waves*	Adriano Amaricci
	Physics	*Science jumping*	Adriano Amaricci
	Physics	*Tasting a star*	Claudia Antolini
	Physics	*Universe: let's taste, smell, hear, watch and touch it*	Claudia Antolini
	Physics	*Cats: solid, liquid or gas?*	Matteo Becchi and Francesca Rizzato
	Neuroscience	*Unity makes...the brain*	Alessandra Capuozzo and Sara de Carlo
	Neuroscience	*How can the brain tell stories?*	Kristina Egumenovska e Davide Spalla
	Neuroscience	*A snack with the brain*	Micaela Grandolfo
	Neuroscience	*Science of colors and colors of science*	Sara Laporte
	Physics	*A cosmic fruit salad*	Claudia Mancuso
	Physics	*Being a computer*	Simone Notarnicola and Angelo Russomanno
	Neuroscience	*And you, do you use your nose?*	Valentina Parma
	Neuroscience	*What kind of cell I will be when I grow up?*	Wendy Tignani and Jessica Zucco
	Neuroscience	*Neurons' chats*	Wendy Tignani, Manuela Santo and Jessica Zucco
	Physics	*It's raining... stars!*	Alessandro Trani and Giuseppe Puglisi
	Neuroscience	*The brain and the reading of words*	Francesca Franzon
	Mathematics	*Do-Re-Mathematics: the sound of Geometry*	Maria Strazzullo
	Scientific method	*What is there inside the box?*	Francesca Rizzato

II-III school years	Neuroscience	*When ideas fight, the brain acts as referee*	Olga Puccioni
III-V school years	Mathematics	*Art, numbers and shapes: the golden ratio.*	Stefano Amato
	Mathematics	*How do mathematicians play?*	Stefano Amato e Lucia Tealdi
	Physics	*Our ideas of the universe*	Carlo Baccigalupi, Rossella Aversa, Eolo Di Casola
	Mathematics	*Counting using your finger to understand computers*	Barbara Fantechi
	Neuroscience	*How to trick the brain*	Olga Puccioni
	Neuroscience	*Brain? It's us…*	Olga Puccioni
	Neuroscience	*Which type of cells I'll be when I grow up*	Carmen Falcone & Simone Chiola
IV-V school years	Physics	*Matryoshka universe*	Claudia Mancuso
	Physics	*Let's discover the universe*	Claudia Mancuso
	Neuroscience	*Let's move!*	Dario Olivieri
	Physics	*Where does the light fall? The mysterious black holes*	Costantino Pacilio
	Neuroscience	*Let's pass through the cells membrane*	Gianluca Pietra
	Neuroscience	*SENSing the world around us*	Simone Pifferi and Olga Puccioni
	Neuroscience and physics	*Bees, ants and informatics*	Sofia Rossi e Cristiano De Nobili
	Physics	*Read and write…DNA*	Elena Tea Russo
	Mathematics	*Fractal is served!*	Lucia Tealdi
	Neuroscience	*The language of thought*	Mara de Rosa
JUNIOR HIGH SCHOOLS (listed according to first author)			
VI-VIII school years	Physics	*More is different!*	Adriano Amaricci
	Mathematics	*The seven bridges of Königsberg*	Francesca Arici
	Mathematics	*Teachers prefer Mathematics*	Francesca Arici and Lucia Tealdi
	Physics	*Quirks and strangenesses from quarks' world*	Alessio Belenchia

	Physics	*Space, Time and Light: how Einstein changed the world.*	Alessio Belenchia
	Physics	*Einstein and his space and time theory.*	Alessio Belenchia
	Neuroscience	*Myths about brain: true or false?*	Maria Bertuzzi
	Neuroscience	*Transcranial Magnetic Stimulation Laboratory*	Domenica Bueti
	Physics	*From where sky ends...*	Juan Manuels Carmona Loaiza
	Physics	*If you want to keep a secret... tell it to a black hole!*	Juan Manuels Carmona Loaiza
	Mathematics	*Music and waves*	Matteo Casati
	-	*Discussion game: The future of science*	Simona Cerrato
	-	*Discussion game: Do you want to know a secret?*	Simona Cerrato
	Neuroscience	*Music in the brain*	Silvia Corsini and Daniele Maraspin
	Mathematics	*Drawing with math*	Daniele Dimonte
	Neuroscience	*Brain's tricks*	Adina Drumea and Shima Talehy Moineddin
	Neuroscience	*Scientist for a day*	Adina Drumea
	Neuroscience	*Brain: still so much to discover*	Adina Drumea and Shima Talehy Moineddin
	Mathematics	*Quiz: The words of mathematics*	Barbara Fantechi
	Mathematics	*Quiz: How to build an IKEA wardrobe*	Barbara Fantechi
	Mathematics	*What modern mathematicians do*	Barbara Fantechi
	Neuroscience	*Cut and sew course with DNA.*	Jessica Franzot
	Neuroscience	*Neuroscience laboratories visit*	Micaela Grandolfo and Jessica Franzot
	Neuroscience	*Let's play with the light lightening up and down cells.*	Micaela Grandolfo
	Mathematics	*Profession: coach of micro swimmers*	Luca Heltai

	Mathematics	*Drawing numbers*	Ilaria Lucardesi
	Mathematics	*Nature save…*	Ilaria Lucardesi
	Physics	*Science in your home*	Uriel Luviano and Irene Adroher-Benítez
	Physics	*Matryoshka Universe*	Claudia Mancuso
	Physics	*Spatial waves hunters*	Claudia Mancuso
	Biophysics	*Nuclear: a forbidden fruit*	Mattia Marenda
	Mathematics	*The mathematic of Sphynx*	Lorenzo Nardini
	Physics	*The misunderstood universe*	Andrea Oddo
	Physics	*Space's Curiosities*	Andrea Oddo
	Neuroscience	*Let's move!*	Dario Olivieri
	Physics	*Einstein gravitational elevator*	Costantino Pacilio
	Neuroscience	*Smelling the danger*	Valentina Parma
	Neuroscience	*Virtual laboratory of cell cultures*	Beatrice Pastore
	Biophysics	*How to unroll the RNA and win tuberculosis C*	Andrea Perez
	Neuroscience	*Sensory extravagances. How the brain knows the external world*	Simone Pifferi
	Neuroscience	*Taste is not enough*	Simone Pifferi
	Neuroscience	*Optical illusions*	Olga Puccioni
	Physics	*Does the Universe trick us?*	Giuseppe Puglisi and Alessandro Trani
	Biophysics	*Magical chemistry*	Francesca Rizzato
	Scientific method	*What is there inside the box?*	Francesca Rizzato
	Computer science	*Let's take the computer apart!*	Francesca Rizzato, Andrea Papale and Elena Tea Russo
	Scientific method / physics	*Tinkering with catapults*	Francesca Rizzato
	Scientific method / physics	*Tinkering with cardboard automata*	Francesca Rizzato
	Neuroscience	*Dancing with bees*	Sofia Rossi e Cristiano De Nobili

	Neuroscience	*Let's make a neuron!*	Manuela Santo and Osvaldo Artimagella
	Physics	*Like raisins in panettone, or: how does a theory of the Universe work?*	Kevin Wolz
	Neuroscience	*Stem cells*	Manuela Santo, Wendy Tignani and Jessica Zucco
	Neuroscience	*EEG laboratory*	Tiziano Suran
	Mathematics	*Water, soap and minimal surfaces*	Lucia Tealdi
	Mathematics	*Fractal is served!*	Lucia Tealdi
	Neuroscience	*DNA laboratory*	Christina Vlachouli and Helena Krmac
HIGH SCHOOLS (listed according to area and surname of first author)			
PHYSICS	*Quantum physics with the naked eye: from electrons to superconductivity*		Adriano Amaricci
	More is different: short stories of collective phenomena		Adriano Amaricci
	Order from disorder		Adriano Amaricci
	Interdisciplinarity		Daniele Amati
	Are galaxies socially distant?		Darko Donevski
	The blurred boundaries between scientific disciplines		Daniele Amati
	The dark engine of the universe		Claudia Antolini
	Gravitational waves from the Big Bang		Carlo Baccigalupi
	A selfie from the universe		Carlo Baccigalupi
	In search of ET: the exoplanets		Carlo Baccigalupi
	What is left from the Big Bang: the life of a cosmologist in the past, present and future		Carlo Baccigalupi and Giuseppe Puglisi with Marzia Umani
	What is the color of flowers through a silicon lens?		Stefano Baroni
	The paradox of medical tests: when statistics and intuition collide		Matteo Becchi
	Space, Time and Light: how Einstein changed the world.		Alessio Belenchia
	The (poor) Schrödinger's cat: oddities and curiosities from the quantum world		Alessio Belenchia

Space, time e Albert: 100 revolutionary years.	Alessio Belenchia
The history of the universe at a glance	PhD students from the Astrophysics and cosmology and Astroparticle groups based on the exhibit at 6th floor
From Newton to strings in 30 minutes	Matteo Bertolini
Listening to the Universe with gravitational waves	Lumen Boco and Beatrice Allegri
The Saga of symmetries in physics	Loriano Bonora
The Universe and its symmetries	Loriano Bonora
Mistreating matter	Massimo Capone
Physics Superconductivity: will the super evil save the world?	Massimo Capone
Abused super-active: the surprising new superconductors and our future	Massimo Capone
Black holes and revelation	Manuel Juan Carmona
Who has ever seen a black hole? Who has fallen in it?	Manuel Juan Carmona
Geometry is boring…for that it works!	Eolo Di Casola
Time machine: science or science fiction?	Eolo Di Casola
The Anthropic Principle	Eolo Di Casola
Ideas of space and time	Eolo Di Casola
Theory (and theories) of gravity, that is: story of a free falling	Eolo Di Casola
Detection of gravitational waves	Eolo Di Casola
There is a physicist, a mathematician and a gardener ... namely: tools to choose a good theory of gravitation	Eolo Di Casola
What are we looking for out there?	Eolo Di Casola and Claudia Mancuso
A space journey	Chiara Di Paolo
Buried in dust: encounters with distant worlds	Darko Donevski
Drunks and snakes: the strange world of simulations	Thorben Fröhling, Matteo Becchi and Diego Doimo,
The force of fluctuations	Andrea Gambassi

The Invisible Universe: from neutrinos to dark matter	Josu Hernández García and Juan Herrero Garcia
How can we see black holes	Elias Kammoun
Dialogue between the universe and the data	Nicoletta Krachmalnicoff and Roberto Trotta, with Simona Cerrato, Luca Papapietro, Claudia Sciarma.
Cristals: when the order is created by itself	Sara Laporte
Emmy Noether and her theorem: symmetries in physics	Rodrigo de León Ardón
Quantum entanglement for dummies	Alessio Lerose and Paola Ruggiero
When spacetime is dynamic: neutron stars, black holes and gravitational waves	Stefano Liberati
Black holes and other more extreme spaces explorations at the borders of Relativity	Stefano Liberati
Black holes, wormholes and time machines	Stefano Liberati
From the photon to the chemical bond: a path towards a sustainable future with the energy of the sun	Stefano Fabris
Between science and science fiction: wormholes, black holes and time travel	Stefano Liberati with Elena Tomat and Irene Modolo
What is the time?	Stefano Liberati
Looking for Schrödinger's cat	Uriel Luviano
Dust of galaxies	Claudia Mancuso
But... where do galaxies come from?	Claudia Mancuso
Small, skinny, and hyperactive: the galaxies of the main sequence	Claudia Mancuso
Galaxies: the islands of light in the universe	Claudia Mancuso with Alberto Laratro and Giancarlo Cinini
From laboratory experiments to virtual stimulation: physics meets biology to explain the world	Mattia Marenda with Monia Torre
Matter, antimatter, dark matter: what is the Universe made of?	Guido Martinelli
Suspicious behavior in the elementary particle zoo	David Marzocca

The music of physics	Uriel Luviano and the SISSA Choir
LHC and Higgs Boson	David Marzocca
LHC: promises and discoveries	David Marzocca
Superconductivity and superfluidity: quantum effects to the naked eye	Giacomo Mazza
Towards a superintelligence: the possibilities and risks of developing AI	Paolo Pietro Mazza
Exploring a microscopic world: from polymers to quantum physics	Paolo Pietro Mazza and Elena Tartaglia
Absolute zero	Giuseppe Mussardo
Simply chaos: can the unpredictable be measured?	Simone Nortanicola and Angelo Russomanno
Like black holes in the sky	Andrea Oddo
Science on the sofa: Was Einstein right? Relatively	Andrea Oddo and Ruggero Rollini
The black hole in the garden	Costantino Pacilio
A camera on the world's smallest slide	Emanuele Panizon
Ig-Nobel	Emanuele Panizon and Laura Fanfarillo
Microspheres learning	Emanuele Panizon
In the world of symmetries of Emmy Noether	Roberto Percacci
Quantum gravity: at the edge of space-time	Roberto Percacci
Artificial intelligence and animal behavior	Alberto Pezzotta and Matteo Adorisio
Self driven vehicle: science and ethics	Federico Pigozzi
With the right eyes	Giuseppe Puglisi
The greatest spectacle after the big bang	Giuseppe Puglisi
The search of extraterrestrials: evidence for and against the existence of aliens	Giuseppe Puglisi and Alessandro Trani
Mathematical models and fluid simulations: application to medicine, sport, environment and industry	Giaanluigi Rozza
Synchronization: why the heart cells beat in unison	Stefano Ruffo
Chaos and randomness	Stefano Ruffo

	Synchronization: from the flashing of fireflies to parallel computing	Stefano Ruffo
	The butterfly effect: sensitive dependence of the initial conditions	Stefano Ruffo
	Geometric shapes' hunt	Nicholas Rungi
	Colors in science	Mariami Rusishvili and Sara Laporte
	Many balls in a quantum pinball machine: how to prevent it from crashing	Angelo Russomanno
	Chaos	Angelo Russomanno
	The dark matter awakens	Paolo Salucci
	The dark side of the Universe	Paolo Salucci
	From the reading of thought to the quantum mechanics	Giuseppe Santoro
	The unification of forces	Marco Serone
	Neutrino: elusive, evasive, and so fascinating	Arsenii Titov with Sofia Rossi and Ilaria Gabbarrini
	How many elementary particles are there? Ask Susy	Lorenzo Ubaldi, Anna Greco and Laura Busato
	Why 2 + 2 is not always 4: that is, interference phenomena between the classical and the quantum world	Angelo Valli
	Dark Energy and the accelerated expansion of the universe	Kevin Wolz
PHYSICS AND NEUROSCIENCE	*The mysterious compass*	Beatrice Pastore, Alessandro Trani and Giuseppe Puglisi
		Beatrice Pastore, Costantino Pacilio and Riccardo Murgia
BIOPHYSICS AND DATA SCIENCE	*What does my DNA have to do with a jar of yogurt?*	Irene Adroher - Benítez
	Science on the sofa: how drugs are created	Mattia Bernetti and Ruggero Rollini
	Understand biology with molecular dynamics	Giovanni Bussi
	What do physics look for in biology? Wandering through cells and chromosome	Ana Maria Florescu
	Among the gears of Artificial Intelligence	Alessandro Laio, Elena Tea Russo e Francesca Rizzato
	Laplace's Demon and atomistic simulations	Alessandro Laio and Elena Tea Russo

	How can a physicist explain biologic systems? Examples of ordinary crazyness.	Mattia Marenda
	Physics and biology: not so far away	Mattia Marenda, Matteo Adorisio e Nina Ilieva
	The physics of viruses and molecules	Giovanni Pinamonti
	When the going gets tough, the toughs get... simulate!	Francesca Rizzato
	Complex is not complicated: similarities between a copying class, a flock and magnets	Francesca Rizzato
	Google ecology: the algorithm that changed our lives can save us from extinction?	Francesca Rizzato
	What language do proteins speak?	Elena Tea Russo
	Life the easiest game: from simple rules to biological complexity.	Edoardo Sarti and Giovanni Pinamonti
	Hey Siri, what is computational linguistics?	Gabriele Sarti
MATHEMATICS	*Lab: Mathematics of shapes. Experiments and ideas from biology*	Daniele Agostinelli, Valentina Damioli, Alessandro Lucantonio and Giovanni Noselli
	Computers and their solutions, wrong but useful	Giovanni Alzetta
	The Devil's interval and other mathematical monsters	Stefano Amato
	Matrix is everywhere: graphs and matrices in everyday life	Francesca Arici
	Mathematics of love	Ivan Beschastnyi
	Puzzles and invariants	Ivan Beschastnyi
	The mathematics of the visual system	Ivan Beschastnyi
	What is a flexagon and how to build one	Ivan Beschastnyi
	The proof: what you see depends on how you look	Carolina Biolo
	Mathematic of space: from football to geographical maps	Gabriele Bogo
	That's chaos, not chance	Matteo Casati

Count by ear. From Pythagoras to vocoder	Matteo Casati
Figurae egredentium angulorum	Matteo Casati
A sphere against Euclid	Cecilia Collà and Anna Vallortigara
What are supercomputers used for science? And what challenges can they face?	Stefano Cozzini
Chewing numbers in the clouds: how do scientists do arithmetic	Stefano Cozzini
Who cares about mathematics	Riccardo Cristoferi
Tactile mathematics	Giorgia del Bianco and Stefano Piani
Mathematical tricks	Daniele Dimonte
Dobble, how mathematicians play	Daniele Dimonte and Andrea Papale
Beyond Euclid and Descartes: the invisible geometry	Barbara Fantechi
A non-adjustable world	Michele Graffeo
Behind the scenes of machine learning	Luca Heltai
Profession: coach of micro swimmers	Luca Heltai
Show with the calculator that Zeno was wrong	Roberto Innocente
The lightboard and its phyics	Roberto Innocente
… what if Earth would be a donut?	Antonio Lerario
The one who searches, finds ... and the one who REsearches?	Ilaria Lucardesi
Fantastic rabbits and how to count them	Guido Mazzucca
Mathematics among magic end riddles	Guido Mazzucca
From albatross' flight to the hull of a ship	Andre Mola
Waves, hulls e simulations	Andrea Mola
Not all donuts come out with a single hole	Annamaria Ortu
Playing with probability theory. How far do we go with common sense?	Gabriele Perfetto
Navigating towards the future: from supercomputers to tablets with	Gianluigi Rozza

	mathematical models and scientific computing	
	Mathematics for society	Gianluigi Rozza
	Count the uncountable: how big is infinite?	Alessandro Rubin
	Universe counting	Alessandro Rubin
	Epidemics, vaccinations and mathematical models	Alessandro Rubin
	The unknown Rt index	Alessandro Rubin
	A matter of perspective	Carlo Scarpa
	Simply complex	Carlo Scarpa
	Everything under control: equations for the environment	Maria Strazzullo
	If "clouds are not spheres and mountains are not cones"...	Lucia Tealdi
	Give me a pencil and I will measure the world	Lucia Tealdi
NEUROSCIENCE	*Neurosciences come for lunch*	Marilena Aiello
	Measurements and personal stories: the two neuroscience instruments of studying the brain	Marilena Aiello
	The ways of memory: how we remember poems	Sara Andreetta
	Lab: Look into the brain without opening the head	Georgette Argiris and Sebastian Korb
	Lab: How does your brain develop?	Osvaldo Artimagnella, Vittorai Avaro, Simone Chiola, Michele Frisari, Cristina Fimiani, Gabriele Luzzi, Antonello Mallamaci, Viviana Opinato, Larura Rigoldi, Manuela Santo, Wendalina Tigani and Jessica Zucco
	Nanomaterials and neurons: from brain machine interfaces to cyborg tissues	Laura Ballerini
	The curious brain	Maria Bertuzzi
	Lab: The cutting and sewing together of DNA	Carlotta Bon, Jessica Franzot, Christina Vlachouli, Federica Ferrero and Chiara Santulli
	The brain and the perception of time	Domenica Bueti with Anna Lombardi

Science on the sofa: What the time is for a neuroscientist?	Domenica Bueti with Ruggero Rollini
Lab: In search of the meaning of language	John Carr, Mara de Rosa, Jana Hasenäcker and Mari Ktori
The DNA is mine and I manage it myself. Crack fate	Simone Chiola, isabella Apruzzese and Jessica Racca
The indecisive stem cells	Simone Chiola and Wendy Tigani
Humans against monkeys: the language round	Davide Crepaldi
Mind maps and brain traps	Davide Crepaldi, Gianmarco Ghetti and Giulia Tonel
Cognitive facts and misdeeds behind our reading skills	Davide Crepaldi, Simone Perfetti and Simone Chiusoli
Do you really know your brain? From superpowers to super deceptions	Viola Del Pinto
Behind the doors of the laboratory: The story of an experiment	Adina Drumea
The reality behind the science manual. What scientists are doing as you prepare for your school test	Adina Drumea
Lab: Exploring language with EEG recordings	Kristina Egumenovska, Zeynep Kaya Gökçen and Katarina Marjanovič
The time machine in the brain: how do we perceive time	Anna Fehrenbach and Catia Baldassarri
The mysteries of vision: how do optical illusions work?	Michele Fornaciai
Why does our brain fascinate us? More questions than answers	Ana Flò
The language of the brain	Francesca Franzon and Valentina Pescuma
Cut and sew course with DNA.	Jessica Franzot
Stuck in autopilot: movement, neurons, and neurodegenerative	Vincenzo Giacco with Emma D'Orto and Emanuele Bozzoni
Neuroscience in silico: Mathematics and computers to study the brain	Michele Giugliano and Lorenzo Colombo
"Broadhand" brains	Michele Giugliano

Dialogue between silicon neurons and biological neurons	Michele Giugliano, Luca Heltai, Guido Sanguinetti e Davide Zoccolan, with Simona Cerrato, Luca Papapietro e Claudia Sciarma
Let's play with the light lightening up and down cells.	Micaela Grandolfo
Brain and sugars: dangerous relationships	Micaela Grandolfo
Lab: Turning on the cells	Micaela Grandolfo and Kevin Yarib Gonzalez Velandia
The hippocampus: A window to brain research	Natalia Grion
Recording the taste	*Domenico Guarascio and Nicole Sarno*
Lab: The reading brain is a hard – working brain	*Jana Hasenäcker, Yamil Vidal dos Santos, Viola del Pinto, Olga Solaja*
Lab: Looking into the brain from the outside	Maria Ktori and Yamil dos Santos
Cognitive mechanism promoting social coordination	Jaroslaw Lelonkiewicz
Alien sequence experiment	Jaroslaw Lelonkiewicz
A brain, many genomes	Gabriele Leoni, Federico Ansaloni, Giovanni Spirito, Nicolò Gualandi, Mauro Esposito and Sara Finaurini
Embryonic development of the central nervous system	Antonello Mallamaci
Development of the cerebral cortex	Antonello Mallamaci and his lab group
From nose to brain: olfaction, between science and literature	Anna Menini and Donato Ramani
Introduction to neuroscience	Majid Moshtagh
Lab: Between the forms, sounds, and colors. Towards the discovery of the meaning of words	Andrea Nadalini and Eva Viviani
Smelling the danger	Valentina Parma
Lab: Growing... neurons!	Beatrice Pastore and Massimo Righi
Lab: Cultivating... neurons!	Beatrice Pastore, Francesca Zummo and Federica Ferrero

Nanomaterials as a basis for growing neurons	Simone Perfetti and Laura Ballarini
For a handful of neurons. Team quiz on the brain	Gianluca Pietra and Dario Olivieri
The alphabet of smells	Simone Pifferi
Sensory extravagances	Simone Pifferi
Open and close proteins: senses and ion channels	Simone Pifferi
Pheromones: myth or reality?	Simone Pifferi
The chemical senses: smell and taste	Simone Pifferi and Gianluca Pietra
Physiology of olfaction	Simone Pifferi and Gianluca Pietra
Neuronal circuits and biomaterials	Diletta Pozzi
Plastic and carbon for growing neurons	Diletta Pozzi, Flavia Fortin and Mariateresa Bradascio
If seeing is so simple…try to do it!	Olga Puccioni
Someone reads… and someone understands numbers	Olga Puccioni e Riccardo Cristoferi
The virus quiz	Massimo Righi
The first steps on the brain	Manuela Santo
Science on the sofa: Animal testing. What is really about?	Manuela Santo and Ruggero Rollini
The strange words experiment	Olga Solaja
Lab: Non-invasive brain stimulation	Andrea Solmi
The neural basis of memory how to use it to remember everything	Tiziano Suran and Nicole Beneventi
The world inside the eyes	Shima Talehy Moineddin
My brain makes colour	Shima Talehy Moineddin
Stem cells	Wendy Tignani and Jessica Zucco
Animal experimentation with science and consciousness	Wendy Tigani, Manuela Santo, Federica Baldassari andh Alessandro Tavecchio
Electronics and informatics for neurobiology	Andrea Tomicich

	Eugenio: do you remember the face?	Alessandro Treves
	But really it all comes down to who has it bigger?	Alessandro Treves
	The 2014 Nobel Prize for neuroscience: a path from space to memory	Alessandro Treves
	Know and forget: semantic memory and semantic dementia	Miriam Vignando
	The wisdom of the group: live neuroscience experiment	Rosilari Bellacosa and Natalia Grion
SCIENCE AND SOCIETY	*Discussion game: take care of me*	Monica Belfiore, Theodora Bogdan, Silvia Girardi, Roman Vuerich e Serena Zacchigna inside the project CURIoSA
	Science: a story full of failures	Andrea Belli
	Beautiful and professional documents with LateX	Giorgia del Bianco and Matteo Gamboz
	Send me a selfie	Andrea Delise e Piero Calucci
	Science and stupidity	Tullio Bigiarini and Giorgia del Bianco
	Discussion game: I, Robot. Our life with Artificial Intelligence	Simona Cerrato
	Online security, between clouds and underpants	Andrea Delise
	The dream team of the Italian physics	Davide Montesarchio
	Is science democratic?	Riccardo Murgia, Costantino Pacilio, Nicola Barsagli e Serena Fabrini
	Maksimović: a half life	Giuseppe Mussardo and oscar Pizzulli
	SISSA Student Day Quiz	Andrea Oddo
	Science at any cost and… revenue. Who finances the research and how it manages it	Gabriele Rizzetto

	Discussion game: Superwomen and supermen? Is it right to use drugs and technology to improve the body and mind?	Paola Rodari
	Tinkering with light and shadows	Elena Tea Russo, Matteo Becchi and Francesca Rizzato
	Ask Me Anything	Maria Strazzullo, Uriel Luviano e Diletta Pozzi
	The archipelago of wonders: Paolo Budinich and the birth of the city of science	Erio Tosatti
	We all are Dr. Jekyll and Mr. Hyde: a short journey into behavioral neuroscience	Marcello Turconi
	Between academy and business: research and job opportunities	Simonetta Vetter and Renè Buttò
	Beyond research: effects and benefits for the community	Simonetta Vetter and Renè Buttò