

Popularization and enrichment activities

Living mathematics

presented by Stéphane Vinatier (IREM Limoges)

July 14th 2021

A flowering of various activities

Initiatives of all kinds, more and more numerous:

- ★ national or local; international
- ★ annual or one-time
- ★ small or large
- ★ in or near school, or in public area
- ★ during week end and holidays or after school
- ★ game or research
- ★ look, listen or read
- ★ play and learn; use or create
- ★ imagine and dream
- ★ pleasure and fun related to creating, learning and understanding

Some categories

- ▶ Math clubs, meetings, summer schools and internships
- ▶ Science museums, exhibitions, forums, fairs
- ▶ Public conferences and interventions of researchers in schools
- ▶ Publications, web sites
- ▶ Mathematical competitions in limited time, Olympiads
- ▶ Theater and plastic arts

A few specificities

1. inclusivity: address to all audiences, especially to young people from disadvantaged backgrounds and to girls
2. initiation: the young people are themselves put in a research situation, within the framework of a collective work, often without a competitive dimension
3. framework: the presence of national structures that allow for coordination and collaboration between the various initiatives.

Who does what?

- ▶ Institutions, linked to the major research institutes (CNRS, INRIA), Ministry in charge of education, Universities (IREMs, IHP in Paris, MMI in Lyon, CIRM in Marseille)
- ▶ Science museums, exhibitions, forums, fairs
- ▶ Learned societies (SMF, SMAI, SFdS) and professional associations (APMEP)
- ▶ Large national associations such as Animath, MATH.en.JEANS, ...also Women and Mathematics
- ▶ Smaller regional very active associations
- ▶ Individuals (Mickaël Launay, Marie Lhuissier and Olga Paris-Romaskevich, Houria Lafrance, and many others), by themselves or with institutions
- ▶ Publishers (as Tangente) and other commercial companies

These structures have multiple relationships and frequently work together.

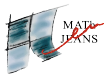
A focus on

Among many other initiatives, we have chosen

- ▶ A young researcher, involved in science mediation
- ▶ Animath, international actions



- ▶ MATH.en.JEANS



- ▶ Girls, Mathematics and Computer Science:

An Enlightening Equation

"Filles, maths et informatique :
une équation lumineuse"



Olga Paris-Romaskevich

Young CNRS researcher in mathematics, member of Marseille Institute of Mathematics, involved in mathematical outreach

- ▶ co-founder of *Mathématiques Vagabondes* (Wandering Math), association connecting art with science, with a focus on math
- ▶ co-author of the website *Mathematics of the sky* telling stories of modern and classical celestial mechanics, ciel.mmi-lyon.fr
- ▶ animator of a cinema&science club at a movie theater Comœdia (MMI, Lyon)
- ▶ co-organiser of the one-week school *Les Cigales* (Cicadas) of discovery of math research for high school girls (CIRM, Marseille)
- ▶ currently working on the exhibition МАТЕМАТИКА on portraits of women in math in Russia, to be presented at ICM2022
- ▶ has a monthly Newsletter about art and outreach



Animath: 23 years of mathematical animation (extracurricular activities)

- ▶ competitions: Alkindi (cryptography, with France-Iol); ITYM; Olympiads
- ▶ **Girls, Mathematics and Computer Science: An Enlightening Equation** (with Women and Mathematics) supported by Fondation Blaise Pascal
- ▶ **International**

Animath, international actions

Very active network

- ▶ Europe, Romania, Moldova, Kosovo, Bulgaria... ITYM: International Tournament of Young Mathematicians was born in 2009 in France.
- ▶ Preparation to Olympiads, OFM (Olympiade Francophone de Mathématiques) junior/senior teams (Belgium, Morocco, Ivory coast, Luxembourg, Switzerland, Tunisia, Quebec, Cameroon). The crypto contest AlKindi gathers 65,000 candidates in France every year, including 350 in Cameroon this year.
- ▶ Africa: Animath coordinates 30 high school mathematics clubs for extracurricular activities in 7 French-speaking countries: Cameroon in 2011, then Benin, Burkina Faso, Congo-Brazzaville, Kinshasa (RDC), Ivory Coast, Senegal; since 2018 within the framework of an agreement with Campus-France.

Animath, international actions



Tribune

[Retour à la rubrique](#)

POURQUOI DÉVELOPPER LES MATHÉMATIQUES PÉRISCOLAIRES EN AFRIQUE SUBSAHARIENNE ?

Le 5 juin 2019 - Écrit par Christian Duhamel



Why develop extracurricular mathematics in sub-Saharan Africa? with partners from Nazi Boni University, Bobo-Dioulasso (Burkina Faso)

A very active partner in Kinshasa and its "math forums"



Forum in Congo, 2018

Animath, actions with China

In charge of the scientific part of the *Counting with the Other* contest, supported by the French Embassy and the MENJ (collaboration with the China Education Association for International Exchange). Aimed at 10th grade students in France and China, about 20 winners in each country (held in 2014, 2017 and 2019).

In 2020, Animath took part to CACIE-2020 (China Annual Conference for International Education & Expo). Special session with Animath and MATH.en.JEANS, a French mathematics teacher in China and Chinese experts.

Next CACIE-2021 conference in October 2021, in Beijing



À PROPOS ACTIONS PARTENAIRES ADHÉSION ET I

Lancement du concours franco-chinois de mathématiques – Compter avec l'autre

Le mercredi 20 mars 2019, en simultané en France et en Chine, environ 20 000 élèves de seconde ont participé à la troisième édition du concours Compter avec l'autre.

En France, 5 000 jeunes de 42 établissements différents répartis à travers tout le territoire, de Bastia à Arras et de La-Roche-sur-Yon à Strasbourg.

Lancement officiel

La cérémonie de lancement officiel a eu lieu le 20 mars au matin (heure de France) dans les deux pays en même temps.



Cérémonie de lancement au lycée Jacques Decour – Paris



Cérémonie de lancement au lycée numéro 35 – Pékin

Girls, Mathematics and Computer Science: An Enlightening Equation

“Filles, maths et informatique :
une équation lumineuse”



A day for Girls

Because

- ▶ social or gender stereotypes are prevalent
- ▶ lack of identification models
- ▶ lack of knowledge of the math and computer science professions

more than a hundred days, first “Girls and Math” now “Girls, Mathematics and Computer Science: An Enlightening Equation” have been organized

- ▶ in an institution of higher learning
- ▶ up to 120 girls, 2 levels,
- ▶ from 9th to 12th grade
- ▶ anywhere in France

Une journée = 4 temps forts



Promenade math ou info



Atelier sur les métiers

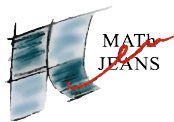


Speed-meeting avec des femmes scientifiques



Théâtre-forum

PresJFetMI2021



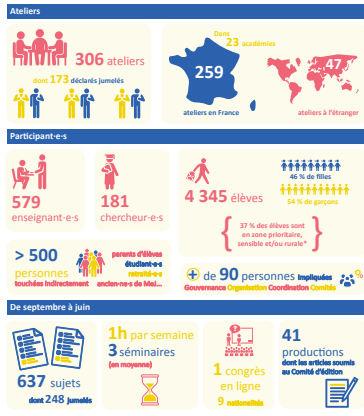
Méthode d'Apprentissage
des Théories mathématiques en
Jumelant des Établissements pour
une Approche Nouvelle du Savoir
*Method of Learning Mathematical
Theories by Pairing Institutions for a
New Approach to Knowledge*

32 years old association, approved by
the National Education

MATh.en.JEANS: how it works

- ▶ Young people work cooperatively (Sept. to March) on a research topic proposed by a researcher, with a teacher who is a referent. In (especially high) schools.
- ▶ Groups from both institutions with the same topic meet several times in seminars in the presence of the researcher, discuss their ideas, share their results.
- ▶ In March-April, the annual conference (in several cities, in a scientific place) brings together all the MATh.en.JEANS workshops of the year and allows the students to present their work and share their taste for mathematics.

MATh.en.JEANS Chiffres clés 2019-2020



*Elèves d'établissements scolaires en réseau d'éducation prioritaire (REP ou REP+) ou situés en ZEP (zone de revitalisation rurale), ou situés à plus de 50 km d'un université, ou élèves de lycée de bordsiers (hors centre-ville des grandes agglomérations).

mathenjeans.fr /Mathenjeans

Créée en 1989, MATh.en.JEANS est une association agréée par l'Éducation Nationale et soutenue par le CNRS et de nombreuses sociétés savantes.

Membre de l'association MATHS en JEANS / Réseau MATHS en JEANS / Septembre 2020

Some figures

- ▶ number of groups, where (in France and abroad)
- ▶ who participates: pupils, teachers, researchers
- ▶ how it works: subjects, seminars, articles

MATh.en.JEANS, international

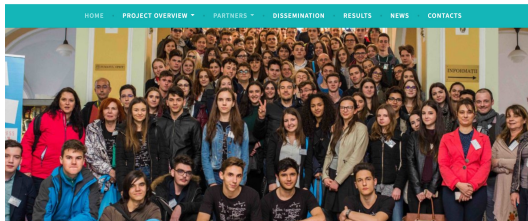
- Network of French high schools abroad (Nederland, Italy, Germany, Algeria, ...), in 2018 conference in Berlin, Pondichéry, Padoue, Chicago)
- Project Erasmus+ “Maths & Languages”



Maths&Languages

- Mathematics research workshops held in a foreign language in secondary schools -

5 international twinings
between 5 European
countries: Romania,
Poland, Italy, Germany
and 10 high schools in
France



Now and after

The pandemic and containment have seriously disrupted the organization of school workshops, math clubs, science fairs and all performances.

Only publishing has been spared (such as Tangente).

Some major events have been organized virtually or in remote mode 2020-21:

MATh.en.JEANS congresses, Grand Forum des Mathématiques Vivantes (March 2021), Math Job Forum for students, and APMEP (Teachers') Association Days, Mathematical culture and games fair <https://salon-math.fr/>



Conclusion of National Presentation

This section illustrates only partially the strong commitment of the French mathematics community to teaching and enrichment issues, to face the difficulties and the complexity of the situations, to innovate while staying the course.

The French mathematics education and research community at large is remarkably vibrant and active, at all levels, from primary school to graduate studies. It is strongly concerned with the idea that math teaching should be inclusive together with high standards and quality of teaching.

This National Presentation has given us the opportunity to think things over, to highlight what works, to point out what is not working or should evolve.

We hope the Presentation may shed light and help understand some specificities of the situation in France and facilitate future collaborations.