IMAGINARY Conference 2016 - Abstracts of Workshops

Resource collection for a curriculum of a University maths/science communication course

Workshop Leader: Silvia Benvenuti (University of Camerino)

Abstract: According to the European Charter for Researchers "all researchers should ensure that their research activities are made known to society at large, so that they can be understood by nonspecialists, thereby improving the understanding of science by the citizens." Therefore, it's part of the researchers' mission to raise the general public awareness with respect to science. On the other hand, science communication requires a specific training, which is not part of the average future researchers education. For this reason, a scientist is likely to fall into many traps, when trying to communicate his research to the general public. The purpose of this workshop is to collect materials and ideas suitable to provide any student from a "scientific" degree course with the basic tools to communicate in matters related to his discipline to an audience of non-experts.

Further information: The workshop is targeted mainly at an audience of researchers, teachers and science communicators: each of these figures can contribute, from his point of view, to the development of the syllabus, and the integration between the different points of view is functional to the success of the workshop itself. Of course, a general interest with the subject of the workshop is desirable.

Spherical geometry in a science museum

Workshop Leader: Ester Dalvit, Marie-Curie-INdAM post-doctoral fellow (University of Camerino and University of Toronto)

Abstract: The aim is to produce images and animations to talk about spherical geometry in a science museum. We will use the ray-tracer POV-Ray and a simple language based on Logo. The animations will be used for projection on the giant NOAA sphere installed in science museums worldwide, including our partner MUSE in Trento, Italy. Proposed themes: Coordinates: longitude and latitude. Straight lines: flight routes. Geometrical properties: parallelism; angle sum of triangles. Regular tessellations and Platonic solids.

Further information: Familiarity with spherical geometry is appreciated, though not mandatory. Elementary programming experience in POV-Ray, or familiarity with a programming language, is required. The Logo-like language is very simple and intuitive. Learning it is straightforward for anybody with a basic knowledge of any programming language.

Participants should bring their own laptop (any operating system). The working language will be mainly English, however the leader also speaks Italian and German.

European Mathematics News Service

Workshop Leaders: Marianne Freiberger and Rachel Thomas (Plus Magazine, University of Cambridge)

Abstract: Over the past years many of us involved in maths communication have discussed a European Mathematics News Service. Such a service would be an easy-to-use conduit for sharing stories about research, applications or events. The contributors may be mathematicians themselves, or science communicators and organisations. The audience for the service would be publishers, broadcasters and media organisations, as well as the wider mathematical community itself. This workshop would produce an action plan, including consultation and a pilot project.

Further information: The audience for this workshop is members of the mathematical community with an interest in widening the audience for news from mathematics, science communicators and members of the mainstream and alternative media. The workshop will be run in English, but we hope to have as broad a representation of the European maths community as possible, as this wide reach will be vital for creating a truly European news service.

Ideally participants will have experience or a desire to communicate mathematics to a wider audience, or experience in publishing content (not necessarily maths related) for a wide audience.

Sorting balls/Algorithme de tri mécanique

Workshop Leader: Robin Jamet (Palais de la découverte)

Abstract: An algorithm is a way to solve a problem without thought, mechanically. Sorting algorithms are good examples to show that to general public: a mechanical machine should be able to sort balls from the heaviest to the lightest.

Resumé: L'objectif est d'avoir des pistes de billes, reliées par des bascules qui permettent d'envoyer la bille la plus lourde sur l'une des pistes en dessous, et la plus légère sur une autre. Les billes arrivent dans des "cases", rangées dans l'ordre.

Défis

1. Comment construire ces bascules? La bille la plus lourde peut évidemment arriver d'un côté ou de l'autre, et doit pourtant toujours repartir sur la même piste à la sortie.

2. Il faut toujours garder suffisamment de pente pour que les billes ne s'arrêtent pas (problème probablement le plus simple)

3. Toujours sur les bascules : comment faire pour que celles-ci ne se déclenchent pas avant que les deux billes ne soit arrivées ? Sinon, c'est toujours la première bille arrivée qui sera considérée comme

(Enfin ça sera plus compliqué que ça !!)

la plus lourde, et la deuxième ne sera plus dans le circuit. Une idée à tester : en utilisant des billes métalliques, celles-ci peuvent fermer un circuit en arrivant dans la bascule.

4. Il faut absolument que les solutions techniques trouvées soient suffisamment simples pour que l'aspect mécanique, automatique de ce tri reste visible. Si le public ne comprend pas comment la machine fonctionne, l'objectif est raté : il y verra une nouvelle boîte noire, un tour de magie.

Further information: This is a bilingual French-English workshop, there will be a translator for those who know only one of the two languages.

    The workshop leader points out that choices have to be made between rigour and feasibility. He welcomes mathematicians and people who are in contact with the general public, but also designers, technicians and carpenters.

    L'essentiel est d'avoir des menuisiers, des techniciens, ingénieurs de toutes sortes. Mail il est également important d'avoir des personnes à l'aise dans les mathématiques et le contact avec le public: Il ne faut pas perdre de vue l'objectiv de cette manipe, qui est de montrer l'aspect automatique et "bete" d'un algorithme tel que ceux que l'on trouve dans un ordinateur.

(Insert sort)

(quick sort)
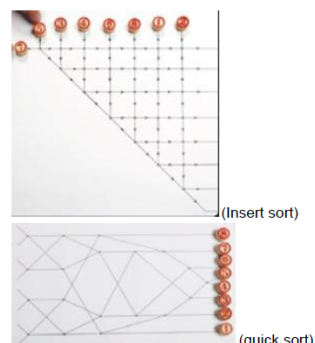
Smartphones in Exhibitions

Workshop Leader: Philipp Legner (Google, Mathigon)

Abstract: While mobile devices are ubiquitous in everyday life, they are rarely utilised in museums and exhibitions, except as guide or to show additional descriptions. In this workshop we want to design exhibits that link with visitors' smartphones on a deeper level: utilising their collective computing power, using them to visualise graphs and networks, or to simulate probability experiments.

    Combining the expertise of mathematicians, teachers and software developers, we will try to create more interactive, immersive and personal museum experiences.

Further information: The workshop wants to combine the skills of teachers and museum curators with those of mathematicians and software engineers – with the former focussed on the initial ideas and design, and the latter focussed on the prototype creation.

    Hopefully the workshop can accommodate a wide range of skills and interests, but participants with mobile design and development experience will be particularly useful. Participants should have access to a laptop and a smartphone.

WikiMathCom

Workshop Leader: Daniel Ramos (IMAGINARY, Université de Montpellier)

Abstract: We will develop WikiMathCom, a wiki page for gathering all projects on math outreach worldwide. We aim to set a reference site to institutions, conferences, museums, exhibits, resources, and much more. Whether you participate or not in the workshop, don't forget to leave a description of your project for the wiki before leaving the conference.

Further information: The intended audience are people with a trajectory in math communication communities, familiar with the different movements and initiatives in one or more countries. Anyone with interest in the community at broad scale. Experience with management of forums, blogs, Wikipedia editing... is useful but not required.

Participants need to bring their own laptop. Languages knowledge (in addition to English) will be useful to gather international projects.

If you have experience in wiki software, server-client workflow, accounts or similar, please point this out in the comment field of the registration form.

Inspiring Mathematics in Africa

Workshop Leader: Mark Roberts (African Institute for Mathematical Sciences, Tanzania)

Abstract: This workshop will masterplan a high profile public engagement campaign to inspire interest in mathematics among school students and broader society in Tanzania. The campaign will pilot innovative new approaches which can then be used elsewhere in Africa. A key aim will be to communicate the importance and excitement of mathematics and its relevance to African life and careers. The campaign may include performances, exhibitions, traditional/new media, stakeholder workshops, etc. An action plan for implementing the masterplan will be developed.

Further information: Useful skills and experience will include:

- Experience of living or working in Africa and of (mathematics) education in Africa

- Experience of promoting the relevance, importance and excitement of mathematics anywhere

- Design, construction, IT or performance skills for public engagement events / exhibits

The lingua franca of the workshop will be English.

Mathematical Education TV program

Workshop Leader: Andrés Sosa (Facultad de Ciencias, Universidad de la República)

Abstract: The idea of this workshop is design the format of a mathematical education TV program for a general audience. The format of the TV series should be designed to be easily adapted for different regions and languages.

Further information: The workshop is targeted for everyone who is interested in the idea of the workshop. Any skill is welcome but it will be great to have graphic and audiovisual designers, mathematicians, and people with experience in media communication.

Virtual Leibniz Abacus

Workshop Leader: Axel Voigt (TU Dresden)

Abstract: With in the Leibniz year we plan a special exhibit on Leibniz at the *Technische Sammlungen Dresden*. An existing and functioning copy of the Leibniz abacus is planed to be one exhibit and should be supplemented by a virtual copy which explains the functionality. The goal of the workshop is to develop this virtual Leibniz abacus.

Further information: We need participants with a decent knowledge in programming and experience in 3D modeling, and designers.

Developing The Guidebook of Elevated Polyhedra: Communicating Mathematics with Art

Workshop Leader: Helen Yu (TWeducare & Partners) and Rinus Roelofs, Sculptor

Abstract: Elevation is a concept introduced by Leonardo da Vinci and Luca Pacioli in their book 'Divine Proportione' (1509). Rinus Roelofs, a sculptor and also a mathematician, was inspired by the concept and has developed a set of simple paper elements to form up models of elevated polyhedra. Through artistic explorations, mathematical concepts have been communicated. During the workshop, we would like to formalize a guidebook on hands-on activities as well as exhibits to facilitate people in mathematics communications with the publication of the guidebook and modules for printing on IMAGINARY platform.

Further information: Our workshop is targeted at any kind of mathematics communicators, e.g. teachers, artists, designers, etc. Interests in polyhedra and/ or familiarities with 3D software would be a plus.

The main language of the workshop will be English; however, the workshop leaders also speak Dutch and Chinese.