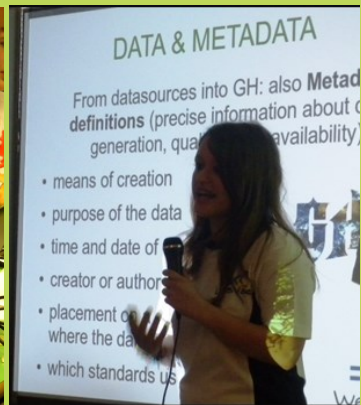# San Lorenzo in Banale, Trentino
June 22-July 12, 2014

WebValley

2014 International Edition

FIRST CALL ANNOUNCEMENT

V1.4, 7 May 2014

http://webvalley.fbk.eu

DATA & METADATA

From datasources into GH: also **Metad**
definitions (precise information about
generation, qua availability)

· means of creation
· purpose of the data
· time and date of
· creator or authors
· placement o
  where the da
· which standards us

The 2014 International Edition

Fondazione Bruno Kessler (FBK) is glad to announce the organization of **WebValley 2014 - International in San Lorenzo in Banale, Trentino (June 22-July 12, 2014)**. Online call for applications will be open **Apr 18 - May 31**.

WebValley is the FBK summer school for dissemination of interdisciplinary research: **more than 250 students (17-18y old)** have attended the WebValley camps since its first edition in 2001. WebValley started as a regional initiative for high school students from Trentino Alto-Adige Sud-Tirol, and it is now grown as an opportunity for national and international students alike.

The aim of WebValley 2014 is **to design a novel web platform for studying microbiota dysbiosis in childhood**. **The platform shall connect -omics data and clinical phenotypes, implementing a system medicine approach, with a special focus on the support of reproducible research within interdisciplinary projects.** The team will partner with researchers from a major Children's hospital and research institutes, international experts in bioinformatics for functional metagenomics, and specialist web developers. We expect to develop an open source working prototype solution as well as to explore the biotechnology and predictive modeling aspects, such as profiling and network analysis. The prototype will be tested on original and open access datasets of clinical interest.

For the 2014 edition, up to **20 seats will be available.** Based on co-funding by collaborating institutions, **full (including travel) and partial fellowships will be offered** covering full tuition, accommodation, leisure time activities, and local travel costs. The team will be tentatively composed of:
   6 Trentino (FBK fellowships)
   4 National (1 fellowship by FAST - Federation of Scientific and Technical Associations, and 2 by MIUR National PLS Program for Mathematics and Science Education)
   10 International (4 full and 2 partial fellowships by FBK Trustees Board)

The **requirements** to participate are:
- High School student (for Italy: 4th year completed)
- Good knowledge of English
- Enthusiasm in science and new technologies
- Above-average school records
- 2 letters: 1 Student Motivation letter and 1 Teacher's Recommendation letter

Info and on line applications: http://webvalley.fbk.eu

Welcome to the Lab (4 hs)
Resources (1)
Team Building (2)
The Challenge (1)

Basics & Tools (5)
Web2.0 collaborative tools (2)
The Open Source paradigms (2)
Intellectual properties (1)

Computer Science Background (14)
Linux Operating System (3)
Intro to programming with Python (4)
Object Oriented Programming (2)
Web Technologies: HTML/CSS/JS (3)
Virtualization and Cloud Computing (2)

Data Science Methods (8)
Basics of Statistics with R (4)
Interactive Data Visualization (2)
Machine Learning (2)

Bioinformatics for Metagenomics (8)
R & Python tools (4)
Metagenomics pipelines with Galaxy (2)
Microbiome analysis with QIIME (2)

Biological Background (10)
Introduction to Genomics (2)
Functional Metagenomics (2)
Diversity of human microbiome (1)
Next-gen sequencing, a crash course (2)
The healthy microbiota (1)
Nutrition and Microbiome (1)
Microbiota Dysbiosis (1)

Predictive Biomarkers (6)
Biomarker discovery (1)
Predictive Models for metagenomics (1)
Basics of network theory (2)
Network visualization (2)

Databases & Web (6)
Science, Big Data, and Reproducibility (1)
Intro to Databases, Django, JSON,
and advanced JavaScript (3)
Standards for Data Sharing (2)

mHealth (4)
Quantified Self and Wearable Sensors (1)
Web/mobile tools for Systems Medicine (2)
Apps for Nutritional Phenotype Assessment(1)

Teamwork
Lab work, project brainstorming
and special topic presentations (70)
Excursion and Leisure Time (50)
Final Presentation (10)

Lab opening times: from 9 to 24

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A Summer School since 2001

THE AIM

The school aims to **introduce students to interdisciplinary research by combining an identified scientific challenge with new technologies**. The school strongly encourages the participation of all genders and various backgrounds. The WebValley Lab provides computing resources and devices to test new ways of exploring data patterns. Students joining the school work in a lively and interactive environment together with a group of researchers from the Bruno Kessler Foundation and selected experts, also interacting through teleconference with other labs. **The 2014 project will have the support of international experts in functional metagenomics, mathematics of biological systems, biomedicine and computational biology.**

THE FORMULA

- **Create a team of enthusiastic and motivated high school students (17-18 y) tutored by researchers.**
- **The team accepts a challenge** by a collaborating scientist from Ecology, Biology or Social Sciences and develops **in three weeks** a new web-based prototype for data analysis and management in relation to a problem of ethical interest. In 2014, the project will be commissioned by the Children's Hospital and Research Institute, Bambino Gesù, Rome.
- Students are introduced to **Open Source** software tools (scientific programming, web-mobile interfaces, GIS, databases, data analysis and visualization); they discuss, design and develop the new system interacting with scientists. They learn to select tools, organize their own workplan, and respond with a new solution. A working prototype web solution and technical results are presented at the end of the three week period.
- **The project activities are developed mostly in teamwork** as in a true research environment, that is informal and of high quality in resources, competence and organization. Each student can differently contribute to the project with ideas, software code or data preparation, design of new web interfaces, and project presentation.
- **The location**: the school is held in **a high-tech lab located in a small Alpine village**, to demonstrate that web access may support new types of innovative actions also in remote areas, thus combining new technologies and high-quality of life in a natural environment.
- **Lab is open all day**, but group activities and leisure time are also part of the three week course.

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THE GOALS

1. Encourage smart students to be entrepreneurs in science
2. Interdisciplinarity
3. Transform internet into an innovation building environment
4. Develop team-work, collaboration, fast-prototyping attitudes
5. Use sophisticated open source methods in an informal teaching environment
6. Expose to challenging research themes of strong ethical interest
7. Using high quality data from scientific or statistical institutions
8. Promote the adoption of standard formats and sharing data policies

For sponsoring organizations: to learn from young people which are the new skills and the potential for a new generation of scientists.

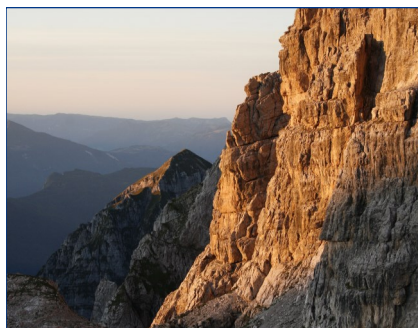**See the website for highlights, video and articles about the WebValley initiative.**

FROM THE DOLOMITES TO THE GARDA LAKE (http://www.visitacomano.it)

In 2014, the WebValley Scholl will be held in S. Lorenzo in Banale (Western Trentino). Only 30 km separate the 3173 meters of the Cima Tosa glacier, the highest elevation of the Brenta Dolomites, from the 70 meters of the waters of Lake Garda, the largest Italian lake: here the nature offers a wealth of natural environments and landscapes in an unique Alpine ecosystem.

SAN LORENZO IN BANALE

At the entrance of the beautiful Val d'Ambiez and close to the Comano Terme Spa, San Lorenzo in Banale (800 masl) is the gateway to the Adamello-Brenta Natural Park. S. Lorenzo is a rural village, stretched out on a vast natural balcony under the imposing walls of the Brenta Dolomites (UNESCO World Heritage Site), offering summer and winter sport opportunities. Originally of a medioeval structure, S. Lorenzo in Banale is featured into the list of the most beautiful villages in Italy. It also offers a modern sport center.

THE BIOSPHERE: AN EXTRAORDINARY NATURAL AND HUMAN HISTORY HERITAGE

San Lorenzo in Banale lies within the Comano Salus Valley, the only Trentino Alto Adige area candidate as "UNESCO Biosphere Reserve". The Reserve includes five million trees that produce 10,000 pounds of oxygen, and a total of 17,000 hectares of green space — of which 12,300 of woodland and 4,700 of pasture — with 26 million kWh of clean energy annually produced from renewable sources. Human presence dates back to VII M BC, with unique heritage sites such as the Neolitic Palafitte Museum in Fiavè and the Stenico Castle.

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Fondazione Bruno Kessler

Over 350 researchers, 220 between students working on their thesis, doctorate students and visiting scientists combined; 8 international Research Centers; 7 laboratories, including a Micro-technologies laboratory fully equipped for the production of silicon devices ; 11 between spin-offs and start-ups; a library specialized in historical and philosophical-theological sciences with over 250.000 volumes. These are the numbers of the Fondazione Bruno Kessler (FBK), which carries out research activities in the fields of Information Technology, Materials and Microsys-tems, Nuclear Physics, Historical Italian-German Studies and Religious Sciences. By means of its partnerships FBK also works in the fields of International Relations, European Economic Institu-tions, Conflicts resolution, Communication and Public Policies. **http://www.fbk.eu**

Foto Carlo Baroni - Archivio Fotografico : FBK

The Predictive Models for Biomedicine and Environment Research Unit (MPBA)

The core group organizing the Summer School is a team of MPBA researchers and WebValley alumni from former editions. MPBA's scientific challenge is itself interdisciplinary: we develop models and computational tools for big data analytics for human and environmental health. Methods have to deal with complex data patterns from next-gen sequencing, global health and environmental maps. Up to millions of features or samples are used and still reproducibility must be supported. MPBA projects have strong ethical impact and are deployed by a mix of open source scientific computing, machine learning, geospatial technologies and web solu-tions. MPBA is a research unit of the FBK Center for Information Technology.

http://mpba.fbk.eu

SPECIAL THANKS TO

Provincia Autonoma di Trento

APT Terme di Comano - Dolomiti di Brenta

Comune di San Lorenzo in Banale

EDULIfE

FAST: Federation of the Scientific and Technical Associations, Italy

FBK Board of Directors

Italian Embassy, Washington DC

MIUR National Program for Mathematics and Science Education (PLS)

NYEX: Network of Young Excellence

Trentino Network

US Society for Science - INTEL ISEF

Center for Integrative Biology, UniTN

Children's Hospital and Research Institute, Bambino Gesù, Rome

Dip. di Pediatria e Neuropsichiatria Infantile, Sapienza — Università di Roma

Fondazione Edmund Mach

FBK > < Eventi*MPBA

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