

Castello di Fiemme, Trentino

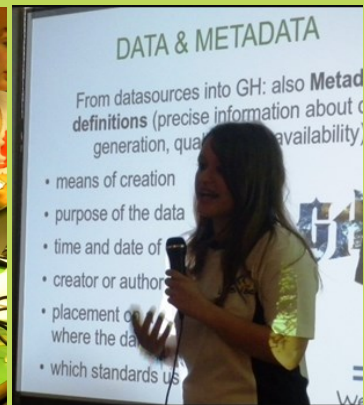
June 30-July 20, 2013



2013 International Edition  
FIRST CALL ANNOUNCEMENT

23 April 2013

<http://webvalley.fbk.eu>



## DATA & METADATA

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

- means of creation
- purpose of the data
- time and date of
- creator or author
- placement of where the data
- which standards us

## The 2013 International Edition

Fondazione Bruno Kessler (FBK) is glad to announce the organization of **WebValley 2013 - International in Castello di Fiemme, Trentino (June 30-July 20, 2013)**. On-line applications will be open **Apr 17 - May 31**.

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

The aim of WebValley 2013 is **designing a novel web tool for studying change in cells** (e.g. in morphogenesis or in disease) from different points of view and in interdisciplinary teams. We aim to extend the nanoWebGIS system for shared studies on **bioimages** with an interface for **3D spatial structure** investigation and a whole new module for **complex networks** analysis. The project shall **integrate mathematical and biological aspects**, with the opportunity of working on original data from collaborating international labs. **Technology will be the backbone of the project**: the team will combine different open source software tools and propose new ways of interacting with bioimages and networks on non-standard devices such as smart TV displays.

**Fellowships** will include full tuition, accommodation and travel costs. Thanks to cofunding by collaborating institutions, for the 2013 edition, **20 fellowships are available** for students from:

7 Trentino-AltoAdige/SüdTirol

6 National (co-funding : PLS - National Program for Mathematics and Science Education and FAST - Federation of Scientific and Technical Associations)

7 International (co-funding: 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



## The Program

### Welcome to the Lab (4)

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)

### Statistical Computing (5)

Basics of Statistics with R (2)  
Interactive Data Visualization (1)  
Spatial statistics in R (1)  
Machine Learning (1)

### Geospatial Computing (7)

Intro to GRASS GIS and QGIS: (4)  
Geographic data and cartography (1)  
WebGIS and applications (2)

### Biological Background (10)

Developmental biology, a crash course (2)  
From Cell to Organism: complexity levels (2)  
Biological molecules: structure, function and regulation, bioinformatics resources (3)  
Cell signaling and PP interactions (1)  
Communication and information processing in embryogenesis and cell plasticity (1)  
Quantitative measures of morphogenesis (1)

### Complex Networks (10)

Basics of network theory (3)  
Network Lab (2)  
Biological networks & inference (3)  
Network visualization (2)

### Databases & Web (8)

Science, Big Data, and Reproducibility (1)  
Intro to Databases & GeoDatabases (3)  
Django, JSON, and advanced JavaScript (4)

### New Interfaces (4)

Wearable Sensors Lab (2)  
Web Mobile Interfaces Lab (2)

### 2D/3D Bioimage Analysis (6)

Intro to 3D analysis (1)  
2D/3D libraries: OpenCV, ITK, VTK (2)  
Bioimage analysis: CellProfiler (1)  
3D analysis: ParaView, WebGL (2)

### Teamwork

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

**Lab opening times:** from 9 to 24



## A Summer School since 2001

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### THE AIM

The school aims to **introduce students to interdisciplinary research by combining a scientific challenge and new technologies**, favoring the participation of female and male students in projects and innovation. The WebValley Lab will provide computing resources and devices (e.g. , Kinect, Android smartphones, WebTV) to test new ways of exploring data patterns. Students joining the school work in a lively and interactive atmosphere together with a group of researchers from the Bruno Kessler Foundation and selected experts, also interacting through teleconference with other labs. The 2013 project will have the support of international experts in complex networks, mathematics of biological systems, biomedicine and computational biology.

### THE FORMULA

- **Create a team of enthusiastic and motivated high school students (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 2013, the project will be commissioned directly by FBK and Rome Child Hospital.
- Students are introduced to **Open Source** software solutions (scientific programming, web interfaces, database, GIS and data analysis); 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 to a problem of ethical interest. 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 project with ideas, software code or data preparation, design of new web interfaces, 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, 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 weeks.



## 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. Propose challenging themes of ethical interest
7. Use high quality data from scientific or statistical institutions.
8. Learn to use standard formats

***For the sponsoring organizations: learn from young people, how fast they are developing new skills and which is the potential for a new generation of scientists.***

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



## Location

### THE FIEMME VALLEY AND DOLOMITI UNESCO

(<http://www.dolomitiunesco.it>)

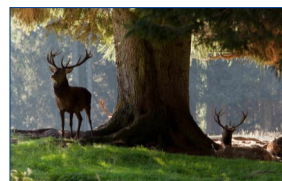
Lying at the foot of the Dolomites, in North-Eastern Trentino, Val di Fiemme is one of the greenest valleys in the entire Alpine area. Spread out among the Lagorai mountain chain, the Latemar group and the renowned Pale di San Martino, it was declared a World Heritage on 2009 by Unesco. With spectacular peaks and

pinnacles, the "Dolomitic Complex" is a big sedimentary plateau at 2600 m of altitude, witnessing the ancient presence of tropical seas and coral reefs of 250 million years ago. The extraordinary diversity of substrates shapes a landscape of high biodiversity value and natural beauty.



**CASTELLO DI FIEMME** - (965 mt. a.s.l.) has ancient roots in the history of free people in the Alps, as witnessed by a Bronze age settlement. Castello maintains the building style of the sixteenth century, with tourist facilities well-mixed among the ancient houses, offering a pleasant and sunny resort, with wide green spaces and numerous walks.

**VAL DI FIEMME FORESTS, AN EXTRAORDINARY WOOD HERITAGE.** Val di Fiemme proudly preserves its impressive expanse of 60 million trees, considered one of the most beautiful in the entire Alpine area. Thanks to extraordinary acoustic features, the resonance fir of Val di Fiemme was renowned by Stradivari and it is still used by master luthiers to realize the harmonic soundboards of valuable stringed instruments, such as organs, pianos, violinos, violas. Val di Fiemme Forests belong nearly exclusively to the local towns and the Magnifica Comunità di Fiemme, an original medieval institution that still operates today for the safeguard of the immense wood heritage and the preservation of the valley historic, social and cultural identity.



## 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 combined; 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 Microsystems, 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 Institutions, Conflicts resolution, Communication and Public Policies. <http://www.fbk.eu>



### 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 linking together 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 solutions. MPBA is a research unit of the FBK Center for Information Technology.

<http://mpba.fbk.eu>



## SPECIAL THANKS TO

Provincia Autonoma di Trento

Provincia Autonoma di Bolzano-SüdTirol

FBK Board of Directors

MIUR: National Program for Mathematics and Science Education (PLS)

FAST: Federation of the Scientific and Technical Associations, Italy

US Society for Science—INTEL ISEF

Museo Tridentino di Scienze Naturali

Comune di Castello-Molina di Fiemme

Trentino Network

EduTech & Computer Learning SRL

Fondazione Mach

Center for Integrative Biology, UniTN

Italian Embassy, Washington DC

Credits for confocal image  
Anna Alisi/OPBG Roma

FBK > < Eventi\*MPBA

## Contacts

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