



2015 International Edition
S. Lorenzo in Banale (Trentino)
June 21 - July 11, 2015

Call for Participants - v2



The 2015 International Edition

Fondazione Bruno Kessler (FBK) is glad to announce the organization of **WebValley 2015 - International in San Lorenzo in Banale, Trentino (June 21-July 11, 2015)**. The online call for applications will be open **Apr 25 - May 31**.

WebValley is the FBK summer school for dissemination of interdisciplinary research: **more than 280 students (17-19y 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 theme of WebValley 2015 is **data analytics of wearable sensors for research**. We aim designing a **novel web platform to support reproducible research based on physiological sensors**. This area of technology develops rapidly, with a wealth of applications to personalized health and well-being. With a focus on **early parent-infant interaction and developmental disorders**, and an interdisciplinary data science approach, the platform will combine **predictive data analytics methods for big data** with **bioinformatics tools**. We will partner with international scientists to study potential markers of psychopathology (e.g. Autism Spectrum Disorders). **We expect to develop an open source working prototype, including a set of body computing modules, as well as to explore predictive modeling aspects** (e.g. network analysis). The methods will be evaluated on original data of clinical interest, but also tested in outdoor activities. The performance of medical standard devices and off-the-shelf personal sensors for quantified self will be compared. Experts in data science and specialist web developers will support the students.

For the 2015 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), 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



The Program

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 (6)

R & Python tools (4)
Predictive pipelines in Bioinformatics (2)

Physiological Background (14)

Introduction to Comparative Physiology
Physiology of Affiliative behaviour.
Infant Calming Response to maternal transport
Early Biomarkers of Developmental Disorders.
Affective Computing
Physiological Networks
Indicators of Heart Rate Variability
Electrodermal Activity

Predictive Biomarkers (6)

Biomarker discovery (1)
Predictive Models for Physio Data (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)

Body Computing (10)

Quantified Self and Wearable Sensors (1)
HW platforms for Inertial Sensing (3)
Web/mobile tools for Personal Medicine (2)
PhysioRec and other WS platforms (2)
Machine learning for Body computing (2)

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



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 2015 project will have the support of international experts in psychology and physiology of affiliative behaviour, neurobiology, predictive biomarkers, low energy wearable sensors.

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 2015, the project will be commissioned by the University of Trento, in collaboration with the Singapore Nanyang Technical University and Nagasaki Graduate School of Biomedical Sciences.
- 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.

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 the organizers: learn from young people which are the new skills of our future colleagues.

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

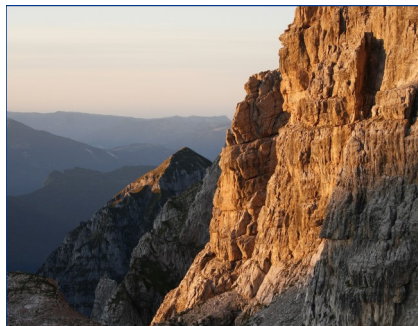


Location

FROM THE DOLOMITES TO THE GARDA LAKE

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

In 2015, the WebValley School 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 Neolithic Palafitte Museum in Fiaavè and the Stenico Castle.



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

<http://mpba.fbk.eu>



SPECIAL THANKS TO

Provincia Autonoma di Trento

FAST: Federation of the Scientific and Technical Associations, Italy

FBK Board of Directors

Ministry of Foreign Affairs and International Cooperation

NYEX: Network of Young Excellence

Trentino Network

US Society for Science - INTEL ISEF

Motorialab S.r.l.

FBK - Energy Efficient Embedded Digital Architectures

University of Trento - Affiliative Behaviour and Physiology Lab*

Nanyang Technological University, Singapore

Graduate School of Biomedical Sciences, Nagasaki University

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FBK > < Eventi*MPBA

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