WebValley

2017 International Edition

Casez di Sanzeno (Trentino)

June 18 - July 8, 2017

Call for Participants

The 2017 International Edition

Fondazione Bruno Kessler (FBK) is glad to announce the organization of **WebValley 2017 - International in Val di Non, Trentino (June 18 - July 08, 2017)**. The online call for applications will be open **Apr 11 - May 31**.

WebValley is the FBK summer school for data science and interdisciplinary research: **more than 300 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 SüdTirol, and it is now grown as an opportunity for national and international students alike.

The 2017 challenge: after a crash course in Data Science, **create a new AI solution for predicting maturation and content on high quality fruit, based on digital profiles from low cost devices (images by smartphones and micro-spectrometers)**. Our students will learn to apply **Deep Learning**, the technical revolution which has enabled autonomous driving. Joining WebValley by means of one of our fellowships will provide **an unique experience on some of the most interesting themes of smart techs and innovation (IOT systems, GPU cloud computing, 3D printing, and more), combined with research in biology and environmental health**. Further, we will simulate and use small size drones to develop a device carrier. The students will be the protagonists, supported by FBK researchers and other tutors of international level. The project will be run in a tech lab, set up by FBK in cozy village in Trentino, Italian Alps.

The outcome products of the project will be evaluated by major national companies, including CAVIT (wine producer) and S. Orsola (#1 berry producer in Italy). Collaborations with Microsoft Azure and Mario Boella Institute will allow to test in the cloud machine learning methods and IOT solutions, in combination with the Hololens device for augmented reality.

For the 2017 edition, up to **20 seats will be available,** sponsored by FBK, the FBK Trustees Board, and partner organizations. **Full (including travel) and partial fellowships will be offered** covering full tuition, accommodation, leisure time activities, and local travel costs. The team will include students from Trentino, nationals and internationals.

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)

Bio/Ecoinformatics (6)
R & Python tools (4)
Predictive pipelines
in Bio/Ecoinformatics (2)

Background (10)
A primer on Spectroscopy
Chemical Analysis of Fruit
Fruit Maturity and Quality
Spectrometry: Data Processing
Machine Learning for spectral analysis

Predictive Biomarkers (6)
Feature discovery
Predictive Models for Environment
Basics of network theory
Network visualization

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

Crash Course on Deep Learning (8)
Introduction to Deep Learning
Deep Learning for Fruit Detection
Deep Learning Tutorial

IoT and Microsoft Azure Simulator (6)
IoT Systems
Microsoft Azure Simulator
Hololens and augmented reality

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 the principles of Data Science. 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 2017 project will have the support of international experts, such as Dragos Margineantu, Senior Scientist of the AI and Machine Learning group at Boeing Research, and specialists in agricultural sciences and big data, as well as collaborators from Microsoft Azure and Mario Boella Institute.

THE FORMULA

- **Create a team of enthusiastic and motivated high school students (17-19 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 2017, the data science project will be commissioned by CAVIT, one of the major wine producers in Italy, and S. Orsola (#1 berry producer in Italy).**
- 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 work plan, and respond with a new solution. A working prototype web solution and technical results are presented at the end of the three weeks 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 weeks 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 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.

Facebook: @webvalleyinternational

Twitter: @WebValley

YouTube: WebValley Playlist on Fondazione Bruno Kessler channel

IN THE HEART OF BRENTA DOLOMITES AND MADDALENE

(http://www.visitvaldinon.com) In 2017, the WebValley School will be held in **Val di Non**. This green and sunny plateau has many scenic mountain destinations, like the **Brenta Dolomites** and the beautiful Maddalene group, hamlets where traces of ancient history and culture are preserved: here the nature offers a wealth of natural environments and landscapes in an unique Alpine ecosystem.

The valley centre with the artificial lake of **Santa Giustina** is surrounded by green hills with castles immersed in fruit orchard and forests: ancient and fascinating mansions that are definitely worth a visit.
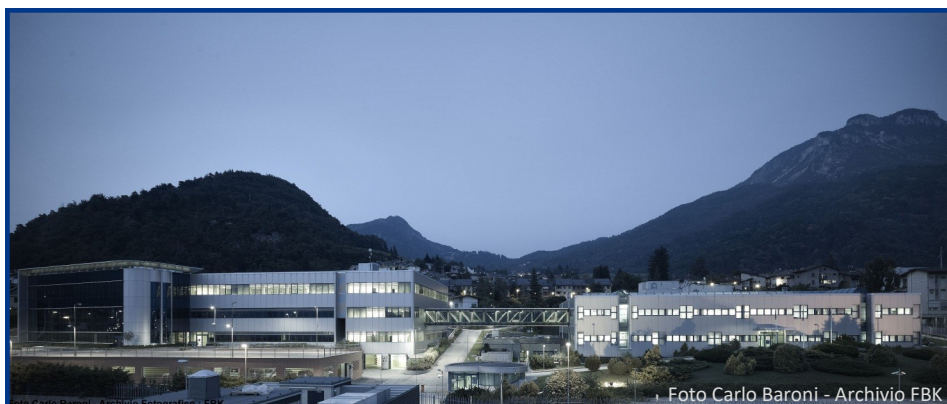
The most imposing is perhaps **Castel Thun**, at the entrance of the valley, which is one of the most prestigious cultural and museum centers in the whole Alpine region. On the south in the heart of the **Adamello-Brenta Nature Park**, **Lake Tovel** stands out like a natural jewel.

The undisputed "queen" of the Val di Non produce remains the **apple**: juicy and delicious in all its assorted varieties (Golden delicious, Red delicious, Renetta...), apples are also the main ingredient of appetizing desserts and cakes like strudel. Some years ago the apples of the Val di Non were awarded the PDO (Protected Designation of Origin) label which ensures the high quality of the product.

See also http://www.visitvaldinon.com

Fondazione Bruno Kessler

Top Research institute in Italy, ranked at the 1st place for scientific excellence within 3 different subject areas (ICT, History and Sociology) and for the economic and social impact according to the quality of research Anvur, promoted by the Italian Ministry for Education, Research an University. Fondazione Bruno Kessler is a research non-profit public interest entity. Being the result of a history that is more than half a century old, through 2 scientific hubs, 7 research centers, 410 researchers, 2 specialized libraries, 7 laboratories, FBK aims to results of excellence in science and technology with particular emphasis on interdisciplinary approaches and to the applicative dimension. We achieve this thanks to our constant attention to collaborations and exchange activities with research organizations, both institutional and corporate, national and international, which extend our innovation capability and involve the community and the local economy in the circulation of knowledge and technologies. **http://www.fbk.eu/**

Foto Carlo Baroni - Archivio 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. The Predictive Models for Biomedicine and Environment (MPBA) Research Unit develops predictive analytics systems based on machine learning, with applications on complex data, in particular in health, environmental risk, and a wide range of applications. MPBA aims at creating interdisciplinary data science environments backed by state-of-art web infrastructures, using Open Source software and with a commitment to the reproducibility of analyses. The new challenge for the unit is to build novel applications of Deep Learning from complex data, in a network of international collaborations with top research institutions, public bodies and industry. MPBA is a research unit of the FBK ICT Center, in its Complex Data Analytics Research Line. **https://mpbalab.fbk.eu/**

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SPECIAL THANKS TO

Provincia Autonoma di Trento

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Comune di Sanzeno

Boeing Research

Azure Microsoft

FEM—Fondazione Edmund Mach

Istituto Superiore Mario Boella

DIBRIS—Università degli Studi di Genova

HIT—Hub Innovazione Trentino

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