TAC
Open Syllabus and Open Tools to Train Young Data Makers

A one-year learning experience for five schools of Lugano to allow primary school children to produce and understand environmental data related to their urban environment and to develop context-based tools, technology and methods.

University of Applied Sciences and Arts
of Southern Switzerland

SUPSI

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1. CV and Publication list of the Applicant - Serena Cangiano

Serena Cangiano

Curriculum Vitae and significant scientific achievements

Serena Cangiano, Ph.D., MA communication and technologies
Born on 3rd June 1982 in Maddaloni, Italy

Education

01012–02.2015	Ph.D. in Design sciences, University Iuav of Venice
09.2006–07.2008	Master of Science, University of Lugano
09.2001–07.2004	BA, Degree in Communication Sciences**,** University of Salerno

Prior employments and current positions

Since 01.01.2019	Responsible FabLab DACD, digital fabrication laboratory
01.05-01.09.2017	Visiting researcher at IDAS Hongik, Seoul Korea
Since 2018	Researcher R&D WeMake, Makerspace, Milan, Italy
Since 2017	Design lead, WeArePlayLab Foundation
Since 04.2015	Researcher and lecturer, Laboratory of visual culture SUPSI
Since 09.2013	Coordinator MAS in Interaction Design SUPSI
01.2011–03.2015	Ph.D. Student, Laboratory of visual culture, SUPSI
04.2008–04.2011	Assistant researcher, Laboratory of visual culture, SUPSI
09.2007–09.2008	Project manager, Ekidna Design Bureau, Milan
01.2007–09.2007	Project Manager, Aiep, interactive dance company, Milan
07.2007–09.2007	Intern, RSI, archive of Radio and Television of Italian speaking Switzerland
03.2007–06.2007	Intern, CNR, National Research Center, Virtual Heritage Lab, Rome

Financed Projects

2020	Ethafa, First Ventures, Gebert Rüf Stiftung
2019	Machine Learning @School Camp, Techetrepeneurs, Gebert Rüf Stiftung
2019	SUPSI 21, Swiss Universities, Digital Skills Platform for SUPSI
2018	Square Kit for Computational Thinking, Gebert Rüf Stiftung
2017	NEGETO next generation toys for teaching AI, SUPSI research grant
2016-2017	EU project Horizon 2020, *Digital Social Innovation for Europe, agreement*
2014-2015	Re-programmed art: an open manifesto, VIAVAI
2013	New requirements for future uses of research social networks, SWITCH Foundation
2012	Arduino App Tablet application, CTI Cheque

Supervision of students

Artur Strupka, Scholarship Leonardo for MAS in interaction design, project: Shapies a AR app to teach creative programming.

Leyla Tawfik, Scholarship Leonardo for MAS in interaction design, project: Ethafa a kit for teaching electronics to young students through stories.

Giulia Galli, BA in Visual Communication SUPSI, project: Kime, a kit to teach the basics of electronics to kids from 4 to 6.

Ginevra Rudel, BA in Visual Communication SUPSI, project: oKAO a robot to support learning for hospitalized kids

Sara Borghi, BA in Visual Communication SUPSI, project: Computation playground

Teaching activity

Designing Advanced Artifacts, course, MAS in Interaction Design, SUPSI

Adventures in data visualization 2016, workshop, SUPSI, Lugano

Open sourcing programmed art: workshop, ISEA16, Hong Kong

Designing in the current making ecosystem, lecture, Tokyo Tech Institute

Open design for interactive products, lecture, UNICAM, Ascoli Piceno, Italy.

Theory of Interaction Design, BA in Visual Communication, lectures, SUPSI

Design for 3D printing, course, lifelong education program SUPSI

Interaction design, Cross Media Lab, course, BA in Visual Communication

Expert

Creative Business Cup Switzerland

Remodel, Open Hardware, Danish Design Center

LiftConference and Lift:Lab, www.liflab.ch

Creative Hub, www.creativehub.ch

Review activity

Swiss Design Network Symposium

MIS4TEL'20

HES-SO research project review

Awards and fellowships

ETHZ grant for your researchers 2017

Ph.D. Scholarship SNIS “Mobile Access to Knowledge”

Leonardo Foundation, Scholarship for Talented Student 2005

Publications

Peer-reviewed books and monographs

Graziano. V, Romano L., Cangiano S. Fragnito S., (eds.). (2019). *Rebelling with Care*. Commoning technlogies for health, WeMake, Milano.

Banzi M., Cangiano S. & Fornari D. (eds.). (2016). *Tecnologie aperte / Open Technologies*. Monographic issue of Progetto Grafico, 30 (Autumn 2016).

Cangiano S., Fornari D., Seratoni A (eds.), (2015) *Re-programmed art: an open manifesto*, Johan&Levi, Monza

Cangiano S. Romano Z, *Digital Social Innovation Toolkit*, DSI4EU, available from: https://dsi4eu.github.io/toolkit/assets/downloads/DSIToolkit-complete.pdf, last visit 20 August 2017

Peer-reviewed conference proceedings

Froehlich M., Kriegleder M., Cangiano S. Gaehwiler J., Jurt R., *Blimpy - an artistic framework for creating a spatial augmented reality experience with helium blimps, in:* proceedings of ISEA20 Sensient Technologies, Montreal, 2020.

Cangiano S., Loglio M. (2019), *Machine Learning for Creatives: a workshop,* in: proceedings of Art Machines, 4th e 5th January 2019, ISCMA, Hong Kong

Cangiano S., Loglio M., Romano Z. (2017), *The growth of digital social innovation in Europe. An Open Design approach to support innovation for the societal good,* in: The Design Journal Volume 20, 2017 - Issue sup1: Design for Next: Proceedings of the 12th European Academy of Design Conference, Sapienza University of Rome, 12-14 April 2017, edited by Loredana Di Lucchio, Lorenzo Imbesi, Paul Atkinson, Taylor & Francis, Abingdon UK

Cangiano S., Romano z. (2019), *Ease of repair as a design ideal. A reflection on how open source models can support longer lasting ownership of, and care for, technology,* in: Repair Matters, special issue online journal Ephemera.org, (in publication)

Cangiano S., Fornari D. & Seratoni A. (2016). “Re-enacting and Open Sourcing as Methods for Experiencing Programmed Art Utopia”. In O. Tapio Lenio (ed.), ISEA2016 Hong Kong*. Cultural R>Evolution*. Proceedings of the 22nd International Symposium on Electronic Art (pp. 250–252). Hong Kong: School of Creative Media.

Cangiano, S., Fornari, D. (2014), P*roducts as platforms. A framework for designing open source interactive artifacts*, in: Proceedings of DIS14 Designing Interactive Systems Conference Design, ACM New York, NY, USA, pp. 219-222

Cangiano S., Botta M., (2014), *O of Open Design, design, prototype, document, share*, in Ottagono, n. 266, pp.80-89

Cangiano S., Romano Z., Banzi M. (2013), *From wearable computing to the design of interactive open wearables. The impact of Open Design and Open Hardware on the design of wearable computing applications*, in: proceedings of EAD European Academy of Design Conference 2013, Crafting the future, Gothenburg

Cangiano, S., Fornari, D. & Botta, M. (2013), *The integration of open source design and fablab [practices] into Interaction Design Education*, in: proceedings of Fab 9 Research Stream International, conference of Fablabs, Yokoama, Japan

Contributions to books

Cangiano. S, (2019) “Back to the Basics. Why Design (education) is going back to making”, in Loes r., Chiappini L. (eds.), *Critical Maker Reader – Unlearning Technologies*, University of Applied Sciences of Rotterdam, pp. 140-147

Cangiano. S, Fornari, D., (2015) “Open Sourcing Robots: Open Sourcing Social Robotics: humanoid artifacts from the viewpoint of designers”, in Sakary T. (ed.), *Social Robots from a Human Perspective*, Springer London, pp. 100-110

Cangiano S., Romano Z. (2015), “Open Sourcing Wearables”, in Bihanic D. (ed.), *Empowering users through design*, Springer London, pp. 153-176

Fornari, D., Cangiano, S. (2014) “Disruptive concepts and prototypes”, in Botta M., Wiedmer M. (eds.), *Disruptive interaction*, Edizione Casagrande, Bellinzona, pp.96-97

Cangiano S., Fornari D. & Seratoni A. (2016). *Playing with the Building Block of Programmed Art. About the Hypothesis of Gabriele Devecchi.* In M. Devecchi (ed.), *Archive Time. Ways of Talking about Gabriele Devecchi* (pp. 41–47). Milan: Associazione Archivio Gabriele Devecchi.

Patents and licenses

Anceschi, G., Cangiano, S. & Fornari D. (2015). *Esacono*, interactive installation, CC BY NC SA 4.0.

2. Concise project description

2.1. Summary

The TAC project proposes an experimental educational program that focuses on teaching students of primary schools how to produce and understand environmental data related to the urban environment. The goal is offering an innovative learning experience through sensors; the experience provides kids with environmental knowledge and triggers responsible behaviors. The project is stand alone, it is promoted by Laboratory of visual culture FabLab (the lab dedicated to Open innovation at SUPSI) in collaboration with the new Lugano Living Lab established by the Municipality of Lugano and School institute of Lugano with the broader goal of introducing technology education already at the level of the elementary school and facilitating the development of the digital citizenship in relation to the topic of environmental monitoring and data collection.

More specifically, the TAC project delivers an open syllabus with the documentation of educational hands-on activities and a set of open tools that allow teachers to teach the use of environmental sensors and simplified electronics in class. An electronic kit, a mobile station and a web app will help students to understand the urban and natural environment through data science while developing more awareness on sustainability. From how sensors are used to how data are made public and interpreted, the educational experience is immersive and geared toward using technology as a means of learning the world of data, developing key 21st-century skills (collaboration and critical thinking), and understanding STEM (science, technology, engineering, and mathematics) teaching concepts.

The project transfers relevant research and technology skills from academia to citizens, through an interdisciplinary and collaborative action involving the municipality, the primary school teachers and public engagement initiatives of the City of Lugano.

Short Title	TAC project - Open Syllabus
Applicant	Serena Cangiano, SUPSI, LCV
Partners	SUPSI, LCV SUPSI, ISC SUPSI, ISAAC Municipality of Lugano / Lugano Living Lab Municipality of Lugano / School Institute Five schools in Lugano, with 6 classes and 6 teachers.
Duration	12 months - 1 May 2020 - 30 April 2021

2.2. Project outline

Field of research

Digital transformation is highlighting how new technologies can only serve to reinforce forms of social inequity if there is no broader vision of social change (Banerjee, Belson 2015). Based on this awareness, we witness the rise of novel approaches in education that point to applying an ecological and more social-driven perspective to the development of training formats addressing the digitization process. Connected learning, for example, proposes a learning model in which students pursue a personal interest or passion or link this learning and interest to academic achievement, career success, or civic engagement (Ito et al 2013). The principle of connected learning is also explored in the field of STEM education in which the community of educators and researchers pay attention to the opportunity to stimulate the development of key 21st skills such as creativity and complex problem solving together with the mere digital literacy or technological skills (Dede, 2010). One relevant field of application of connected learning is the environmental studies: low-cost sensors and web platforms allow non-expert people to collect and interpret the environment's data so that they can learn more about it. Better environmental education through the use of data and technologies encourages people to behave more attentively and sustainably.
Today, it is essential for new generations to acquire key skills in understanding and analyzing data and information through innovative teaching approaches that are not focused on technological complexity but on practical, inclusive, playful, and collaborative methods. These methods – being realized in Switzerland, Europe, and around the world, now more than ever – lead young people to get in contact with novel technologies in an active way: they can use electronics and sensors to build their own devices and tools as citizen scientists.

Goals and objectives

The project TAC aims at allowing primary school children to produce and understand environmental data related to their urban environment, by developing an innovative learning experience through sensors, based on context-based tools, technology and methods. More broadly the goal of the project is to introduce technology education already at the primary school level, to facilitate the development of digital citizenship in relation to the topic of environmental monitoring and data collection and to trigger environmental knowledge and responsible behaviors.

The objectives of the tools, technology and methods are

1. enabling students to learn, read, and interpret sensor-generated data and information;
2. developing skills in the use of new technologies, particularly sensors connected to the network; this experience allows us to understand technology beyond the classic images of the smartphone, video games, and the web;
3. supporting environmental awareness in relation to citizens' behaviours and the urban context.

The project is a stand-alone initiative focusing in 2020-2021 on five elementary schools of the City of Lugano and involving pupils in fourth grade of six classes (the schools, teachers and classes are already selected and involved through the School Institute of the City of Lugano). By involving the School Institute and by testing and evaluating the learning experience, the project is structured to facilitate its future replicability and its integration in the official school curriculum.

Significance of the project

Individual scale. The project proposes an ecological perspective on technology education: it is structured in distributed and local digital fabrication laboratories and it is based on the availability of low-cost easy to use soft-hard prototyping tools. This allows educators, parents and organizations to be empowered and to implement constructivist learning environments in which they act as facilitators of personalized and collaborative learning experiences. Within this context, we enable students to make their own technology devices (instead of being only passive users) and we contribute to an educative approach based on immersive learning experiences and situations in

which pupils need to create solutions to solve a real problem. Thought is connected learning approach, furthermore the TAC project contributes at

1. rising awareness among citizens – particularly primary school pupils (fourth grade) and their families – to environmental monitoring and sustainability issues;
2. enhancing digital skills among citizens
3. collecting data on the city of Lugano's environment to contribute to the public discourse and decision making.

Local scale. By collaborating officially with the City of Lugano School Institute – the institution which coordinates all activities and teachers of the public kindergartens and primary schools in Lugano – the project points at strengthening the existing initiatives related to digital skills development and computational thinking through educational robotics, implemented by the School Institute through its media and technology program.

Reuse and national and international scale. The TAC project opens its contents and outcomes to the public through public events and through its communication activities and its open license; it facilitates the reuse of its methods and tools at informal educational contexts such as tech education fairs, science centers, public programs dedicated to science and technology.

The project participates in the national strategy Digital Switzerland and to its connected programs focusing on digital skills, open data and public engagement on topics such as climate change. The approach of the project contributes to the working direction of a series of other initiatives that are already active in Switzerland, Europe and USA (see State of the Art-Attached Documents).

References

Banerjee, P. M., Belson, G. (January 26, 2015), Digital education 2.0: From content to connections, Deloitte Issue 16, www2.deloitte.com/insights/us/en/deloitte-review/issue-16/future-digital-education-technology.html, last visit 13 February 2019

Ito, M., Gutiérrez, K., Livingstone, Penuel, B. Rhodes, J. Salen, K., Schor, J. Sefton-Green, J., and Watkins, S. C. (2013) C*onnected learning: an agenda for research and design*. Digital Media and Learning Research Hub, Irvine, CA, USA

Dede, C. (2010). "Comparing Frameworks for 21st Century skills. 21st Century skills: Rethinking how students learn". Eds James Bellanca, Ron Brandt. 21st Century Skills: Rethinking How Students Learn, Bloomington, IN: Solution Tree Press, pp. 51-76.

2.3. Work plan

The TAC project offers an experimental program of activities for fourth- and fifth-grade students to bring them closer to data, environmental education and responsible behaviors. The project aims to develop the following tools and resources:

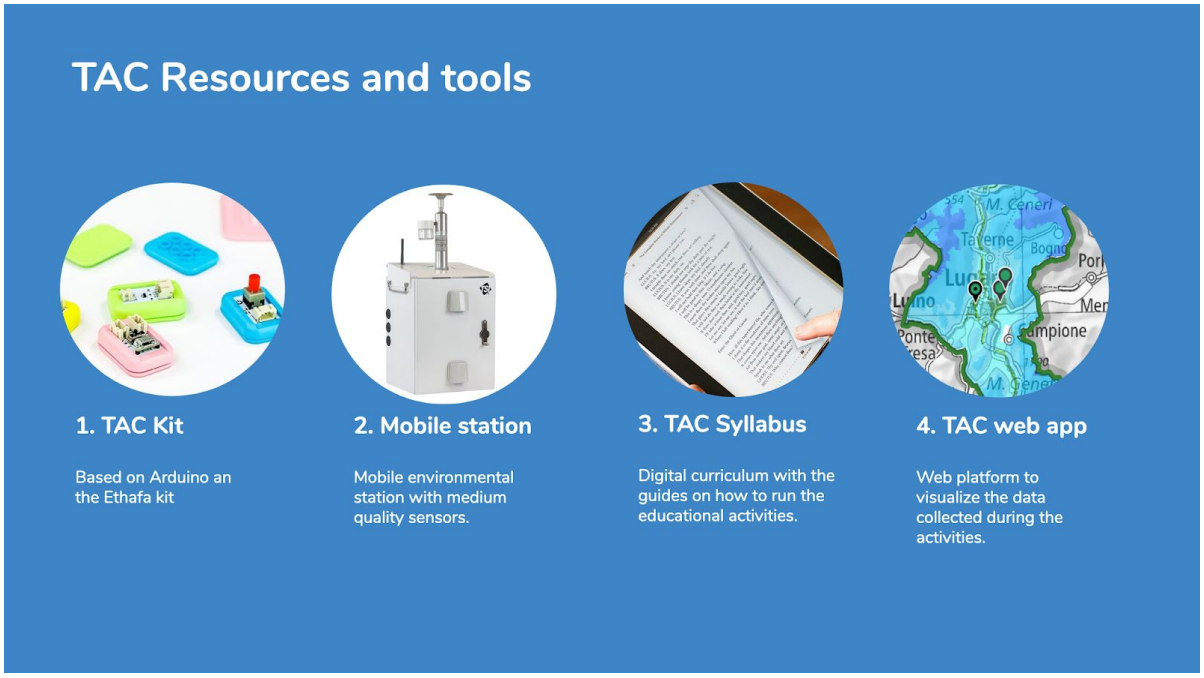
TAC Kit. All activities are centred around a TAC Kit (first tool) that has sensors and low-cost electronic components. The children must assemble it to understand how to collect data on noise, temperature, and external air quality, for example. In order to leverage the research knowledge and expertise on the subject, the TAC kit is based on the open source hardware Arduino (www.arduino.cc) and on a customized derivative based on the existing "Ethafa electronic kit" (www.ethafa.com). The Ethafa kit is modified to offer a personalized experience on the project's themes and objectives.

Mobile Station. The project's second tool is the TAC Mobile Station, which is a monitoring station equipped with more precise environmental sensors, that allows data validation and interpretation. Students and teachers interact with the mobile station to learn how to compare and contextualize the data collected.

WebPlatform. The third tool is a TAC Web platform for collecting and displaying the data gathered during classroom activities and generated by the mobile station. Through an online map, the data validated by the campaigns are made public and accompanied by their interpretive, experiential story.

Open syllabus. Finally, the project produces an open syllabus that supports teachers in running the activities and facilitates the future reproducibility of the initiative in other educational programs. The syllabus integrates the STEM courses (science, technology, engineering, and mathematics) into a single experience by combining:

- the use of electronics, sensors, and actuators that allow experimenting and knowing IoT technologies (Internet of Things);
- data sciences (data literacy): defining data, how it is collected, how it is analyzed, contextualized, and compared with other data;
- education and environmental sensitivity: how information and data support more informed choices that are sustainable on an individual level.



Project detailed activities

Activity 1 - May - September 2020
Design and realization of the electronic kit, the mobile station, and the web platform (version 0.1 functioning prototypes). This activity requires the following actions:
• analysis of open source and low-cost solutions to create the electronic kit and the mobile station • prototyping of the kit: customization for the electronic kit and the mobile station • product and graphic design of the electronic kit and mobile station • development of the functioning prototype of the web platform • test and technology transfer
Team: SUPSI LCV - 1 senior researcher, 1 junior researcher, 1 research assistant SUPSI ISAAC - 1 senior researcher SUPSI IES - 1 senior researcher

Activity 2 - May - September 2020
The realization of the syllabus with the documentation of the educational activities in collaboration with the primary school teachers. This activity requires the following actions:
• organization of co-creation sessions with the teachers • documentation of the activities in form of a digital document • evaluation of the activities

Team:
SUPSI LCV - 1 senior researcher, 1 junior researcher, 1 research assistant;
5 primary school teachers

Activity 3 - October 2020 - June 2021

The testing of the TAC tools and activities in a pilot program distributed over one year in five primary school classes.

- the preparation of the activity
- the teaching in class
- the evaluation of the activity
- the external support to the teaching sessions in class

Team:
SUPSI LCV - 1 junior researcher, 1 research assistant;
6 primary school teachers

Activity 4 - Documentation - August 2020 - May 2021

To facilitate the distribution of the activities as well as the future replicability, the technical training for the teachers and all resources of the project (assembly guides, bill of materials, etc.) will be documented and released online in form of video tutorials, digital guides, instructables. This strategy will ensure the development of the project in cases of mandatory home schooling (i.e pandemia emergency) and to support the adoption of easy to use distance learning solutions.

Team:
SUPSI LCV - 1 junior researcher, 1 research assistant;
6 primary school teachers

Activity 5 - Public engagement and dissemination - April - May 2021

The project aims to open its contents and topics to all citizens through the organizations of two events. The events will be coordinated and promoted by the initiative of the City of Lugano, Lugano Living Lab, that operates to disseminate the impact and outcomes of the project.

Team:
SUPSI LCV - 1 senior researcher
Lugano Living Lab/City of Lugano - 2 communication collaborators

Calendar

M	May 2020	June 2020	July 2020	Aug 2020	Sept 2020	Oct 2020	Nov 2020	Dec 2020	Jan 2021	Feb 2021	March 2021	April 2021
act 1												
act 2												
act 3												
act 4												
act 5												

The work plan takes into account the possibility of implementing all actions in conditions of smart working and mandatory home schooling.

Licenses and credits

The documentation and educational resources of the project is released under the Creative Commons attribution-share alike license (CC BY-SA all), unless differently stated. Specific copyright and IP protection will be applied on the physical kit. No patents will be generated or any other legal restriction to the use and reuse of the project's contents and tools.

Scientific advisor

To ensure that the activities are designed following the correct pedagogical approaches, the project will have a scientific advisor: dr. Lucio Negrini, researcher at Department of Learning SUPSI and head of CAS in Educational Robotics.

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Additional documents

1. Co-Operating Partners

SUPSI LCV - Laboratory of visual culture - Culture and Territory research area and FabLab

The laboratory of visual culture is responsabile of the project management and of the design and technology transfer. The laboratory is responsible for coordinating the design and technical aspects of the project and supports communication and tutoring activities. The laboratory offers competences in interdisciplinary design research, DIY electronics, tech education and digital fabrication.
www.supsi.ch/LCV

www.fablab.supsi.ch

SUPSI ISAAC - Institute of Sustainability Applied to the Built Environment SUPSI

The Institute participates in co-design sessions and supervises the project's participatory approach and impact on behavior change for greater environmental sustainability from a scientific point of view. Project team: Francesca Cellina (senior researcher).

www.supsi.ch/isaac_en.html

SUPSI IST - Institute of Earth Sciences - Geomatics Section

The Institute supports the implementation of the project from a technological point of view with specific attention to the development of mobile stations and the publication of data on the web platform. Project team: Massimiliano Cannata (professor, senior researcher).

www.supsi.ch/ist_en.html

Ethafa Project

The project Ethafa develops an educational framework and a physical kit to teach programming and electronics to kids. The project is incubated by SUPSI Laboratory of visual culture and supervised by dr. Serena Cangiano, head of fablab SUPSI and researcher at LCV. Ethafa's contribution regards the design of the customized derivative kit for the TAC project. The involvement of the Ethafa project will ensure the future supply of the physical kit. Team member: Leyla Tawfik, co-founder of the project ethafa.

www.ethafa.com

City of Lugano - Lugano Living Lab

Lugano Living Lab" is an initiative of the City of Lugano aiming at connecting and facilitating the interaction among citizens and the public administration, academic research centers and companies. The goal is to activate initiatives for the promotion of innovative services and solutions in the urban context. Team members: Elena Marchiori, Robert Bregy (City of Lugano)

www.luganolivinglab.ch

City of Lugano - School Institute

The School Institute of City of Lugano (Istituto Scolastico Comunale) coordinates the primary schools of the Lugano territory with about 4000 pupils. The School Institute manager together with the administration secretary and the directors of the primary schools coordinates the strategic actions and projects.

Director: Fabio Valsangiacomo; Administration: Fabrizio Arnaboldi

2. Project Team

SUPSI LCV Laboratory of visual culture
#1 Serena Cangiano

Researcher, Responsible for FabLab DACD SUPSI (applicant)

Please refer to the full CV of the applicant

#2 Iolanda Pensa

Researcher, Responsible for the LCV research area "Culture and Territory" (senior researcher, project co-leader)

Dr. Iolanda Pensa is senior researcher, head of research in the "Culture and Territory" area at the Laboratory of visual culture and actively involved in the implementation of Open Science within the Research and Innovation team at SUPSI University of Applied Sciences and Arts of Southern Switzerland. Her research work focuses on systems of knowledge production and distribution and on open online collaborative projects, Wikipedia, open licenses and open data. Among her projects "Wikipedia Primary School: Providing on Wikipedia the information necessary to complete the cycle of primary education in the languages used by the different education systems", "Case-based research for education", "Share Your Knowledge: Creative Commons and Wikipedia for cultural institutions", "Swiss Foundations and Open Licenses", "The Alps on Wikipedia" and "Culture and Safety in Africa with all the research documentation on the Wikimedia projects. Previously she was scientific director of the Moleskine Foundation for the project "WikiAfrica: Increasing the quality and quantity of African content on Wikipedia" (which produced over 30'000 contributions to the Wikimedia projects with the involvement of volunteers and over 100 institutions). She organized in 2016 "Wikimania Esino Lario", the Wikipedia world gathering in a 700-inhabitants mountain village of the Alps. Art historian, she holds a Ph.D. in Social anthropology and ethnography at the EHESS in Paris and in Territorial government and planning at the Politecnico di Milano.

#3 Daniele Murgia

Research assistant LCV, interaction designer and prototyping expert.

Daniele Murgia is a research assistant in SUPSI University of Applied Sciences and Arts of Southern Switzerland, Visual Culture Laboratory. He teaches Physical Computing in Genova at Ligustica Academy of Fine Arts. After graduating in Interaction Design at Republic of San Marino University, he won a scholarship and collaborated with the Department of Architecture, Urban Planning and Design in Alghero, University of Sassari, where he works as an interaction designer on a Interactive Museum Design research project. As a freelance he works in the Interaction Design, Interactive Design and Music field, focusing his personal research on multi-sensory interface, user experience in digital environments and cross-platform devices. His research interests are in wearable technologies, haptic design, motion tracking, user interface and gesture recognition. He has experience in organizing trainings and workshops and in managing fablabs and activities related to digital fabrication.

SUPSI ISAAC
#4 Francesca Cellina

Senior Researcher, Institute for Applied Sustainability to the Built Environment

Francesca Cellina is a senior researcher at the Institute for Applied Sustainability to the Built Environment (ISAAC) in the University of Applied Sciences and Arts of Southern Switzerland (SUPSI). She holds a Master of Science degree in environmental engineering from Politecnico di Milano (2001). After graduation, she worked at the research centre Consorzio Poliedra-Politecnico

di Milano, where she gained experience in decision support systems (DSS) for natural resources management, in participatory land planning processes and in strategic environmental assessment (SEA). In SUPSI since 2009, she specialized in energy policies and energy planning processes at the local and regional level. She acted as scientific advisor in the elaboration of the Ticino Canton energy plan and in a variety of municipal energy plans throughout the Canton. Since 2016 she is responsible for the “Sustainability and Society” sector, aimed at favouring the transition towards a low carbon society. With her group, she is now engaged in inter-disciplinary Swiss and EU funded applied research projects, mainly targeting energy conservation at the urban level, particularly in the mobility field. Building on social psychology, behavior science and ICT technologies, she explores the effectiveness of engaging stakeholders and end-users in participatory and inclusive “living lab” processes aimed at triggering individual and collective behavior change.

SUPSI IST

#5 Massimiliano Cannata

Professor, Head of Geomatic Sector, SUPSI

Massimiliano received his PhD in Gedoesy and Geomatics after his master degree in environmental engineering at the Politecnico di Milano. Since 2007 he is the head of the geomatic division within the Institute of Earth Sciences (www.ist.supsi.ch) in Switzerland. He participated in the community since it's inception at various levels. He's a director of the Open Source Geospatial foundation (OSGeo) and member of the project steering committee of the projects and ZOO (http://www.zoo-project.org). From 2006 to 2016 he was also PSC member of the GIS GRASS (http://grass.osgeo.org). He's group lead the development of the istSOS project (http://istsos.org) implementing open standards for sensor observation services. Co-chair of the UnitedNation committee and of the Open Geoscience committee.

Scientific Advisor

Lucio Negrini, researcher DFA SUPSI

Lucio Negrini is researcher and Head of CAS in Educational Robotics at DFA Department of Education and Learning SUPSI. He holds a PhD at the University of Fribourg and at the University of Konstanz (D) and a Master of Science in Education, University of Fribourg. At SUPSI, Lucio Negrini carries out research and educational projects on the integration of media and technologies and STEM discipline at primary school.

3. State of the Art

The project proposes an original approach and a series of activities that are connected to an international research field focusing on digital empowerment, citizen science and environmental monitoring. Below we mention some projects that are part of the research field's state of the art.

School of Data - www.schoolofdata.org

School of Data is a global network of individuals and organizations that promote teaching data use to support the development of fundamental skills in adults and children. The project offers a series of courses and practical initiatives in teaching how data is collected with mobile devices, analyzed, and interpreted through easy-to-use online tools.

Making Sense - http://making-sense.eu

This European project proposes the use of DIY electronic kits for monitoring data through campaigns where children and adults collaborate in collecting and analyzing environmental data. It facilitates active participation in behavior change for greater environmental sustainability.

Kids Making Sense - www.kidsmakingsense.org

Kids Making Sense is a curriculum to support the teaching of environmental data monitoring through telephones and sensors. The project's approach is to train citizen scientists who can monitor their environment through low-cost technological tools that are accessible to everyone.

Learning From OpenCoesione - www.ascuoladiopencoesione.it

Learning From OpenCoesione (LFOC) is an innovative educational path to promote and develop principles of active and aware citizenship in Italian schools through research and civic monitoring of European and national public funding. The project develops digital, statistical, and civic education skills to help students understand, communicate, and intervene in places where they live with the help of journalistic techniques.

Riconnessioni - www.riconnessioni.it

Riconnessioni (Reconnections) tests a system model with primary and secondary schools, accompanying them in the process of technological, organizational, and didactic innovation. The common goal is to make the school the central hub of social transformation by building a solid community with all those involved: teachers, students, and parents. Riconnessioni's intervention is based on fiber-optic infrastructure plus innovative ideas and practices of continuous training where technologies are not the aim but the means to improve the curriculum.

4. Letter of support from the municipality of Lugano

CITTÀ DI LUGANO

SEGRETARIO COMUNALE

Lugano, 25 marzo 2020
centro inf.: 1200.0

Object: Support to the project TAC by the municipality of Lugano

The municipality has been inviting dr. Serena Cangiano and dr. Iolanda Pensa from SUPSI (Scuola universitaria professionale della Svizzera italiana) to propose and prepare a project related to environmental data and technology focusing on Lugano primary schools, which are managed by the Lugano City council through its School Institute. The result of this collaboration is the project TAC.

The Municipality of Lugano cooperates in the development of TAC, it endorses and supports it.

More specifically, through the Lugano Living Lab, the Municipality of Lugano triggers the relationship with the School Institute, it contributes to the project design and it facilitates the establishment of partnerships and links with the urban networks. Furthermore the Lugano Living Lab in 2020 and 2021 supports the communication of the project with a total in-kid contribution of 15'000 chf representing working hours of its communication staff, the use of its communication tools and resources, and the organisation of an event to present the project to a larger audience.

Best regards.

Il Segretario:

Sig. Robert Bregy