# Proofpoint

Swiss Universities of Applied Sciences and Arts

Ausgabe 1
Dezember 2016

## Project: Contrabass Clarinet Extended CLEX

**Bern University of Applied Sciences, BFH**

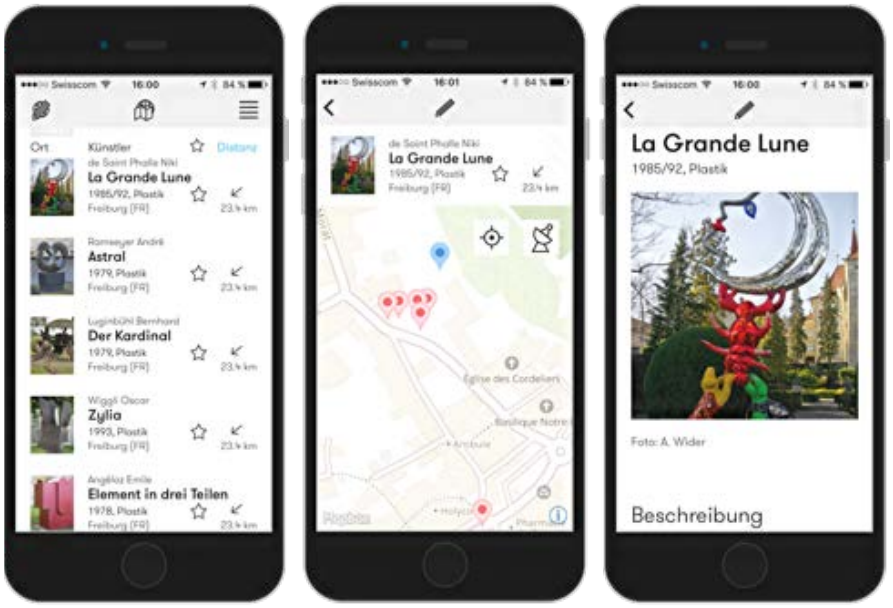
*An interdisciplinary project of the Bern University of the Arts HKB tried to solve the problem of flawed sound and technical quality with contrabass clarinets. In cooperation with Clarinet Solutions GmbH and researchers from the BFH's Department of Engineering and Information Technology, they chose a radically new approach and replaced the traditional mechanics by sensory dynamic and mechatronically operated keys.*

The new instrument, the CLEX (Contrabass clarinet extended), allows for an ideal positioning of the finger holes without any acoustic or technical compromises and both sound and intonation of the contrabass clarinet are markedly improved. Since the traditional fingerings can still be used, musicians adapt easily to the new instrument. At the same time, the electronic control and audio-visual interfaces open up new creative multimedia possibilities for composers and performers alike.

more (in German)

## Project: pARTicipate – a new way of looking at public art

**Bern University of Applied Sciences, BFH**




*The aim of this interdisciplinary project was to develop an application for smartphones and computers enabling people to find public works of art and to access all relevant background data. Primarily, the app is intended as an interactive information service. However, the app users can also use a response tool that enables them to provide feedback to the owners about the state of the artworks (e.g. to report any vandalism, deterioration etc.) or suggest new artworks that are not yet registered in the app.*

The project team is now searching for partners in order to provide information on art in public all over Switzerland. This native app is free and can be downloaded for iOS and Android at particip-app.ch.

more (in German)

---

## Project: Packing systems for paintings

**Bern University of Applied Sciences, BFH**

*As a result of the growing number of art shows and exhibitions, invaluable artworks are transported all over the world. To ensure safe traveling, it is essential to use reliable packaging methods and means of transportation. A team of researchers from the Bern University of Applied Sciences developed new packaging solutions for the transport of fragile paintings, focusing on optimizing shock absorption and vibration damping.*

In a previous project, a representative selection of packaging was examined with respect to its damping potential. The results showed a great need for improvement, for many of the packaging types tested did not offer the desired reduction of vibration immissions. Extensive field and laboratory testing with simulators showed that the packaging types used specifically for transporting fragile paintings in fact even increase vibration immissions. This increase was attributed to resonances caused by the combined system of packaging, painting and rear protection.

Based on these facts, an interdisciplinary team of BFH researchers from the Bern University of the Arts and the Department of Engineering and Information Technology developed new, safe packaging methods, which are constantly monitored, assessed and improved. The project was supported by Swiss insurance companies, art transport specialists as well as various experts from Swiss museums.

more

---

## Project: Revolutionary digital production process for Christenguss

**University of Applied Sciences and Arts Northwestern Switzerland, FHNW**

*The successful cooperation between the non-ferrous foundry Christenguss and FHNW started out as a semester project at the FHNW School of Engineering. Students analyzed the company's production processes and presented suggestions to improve efficiency. Inspired by the results, Christenguss launched the vision "Casting 4.0", which was put into practice in close cooperation with the FHNW's Industry 4.0 experts.*

With the new production process, all required production parameters are digitally defined and innovative algorithms optimize the production process. The overriding process planning is part of a so-called cyber-physical system (CPS). Every cast part has its individual ID code that allows for digital control and regulation of the complete production process from planning and execution to the final quality check. The new digital production not only allows integral quality checks for every cast piece but also an in-situ adjustment of the production.

With the new digitized production, Christenguss saves time and money and is also very resource-efficient because discard is minimized. High quality, individuality and process reliability are ensured, which is especially important with prototypes, single units or small batches.

## Project: First Swiss bachelor in photonics

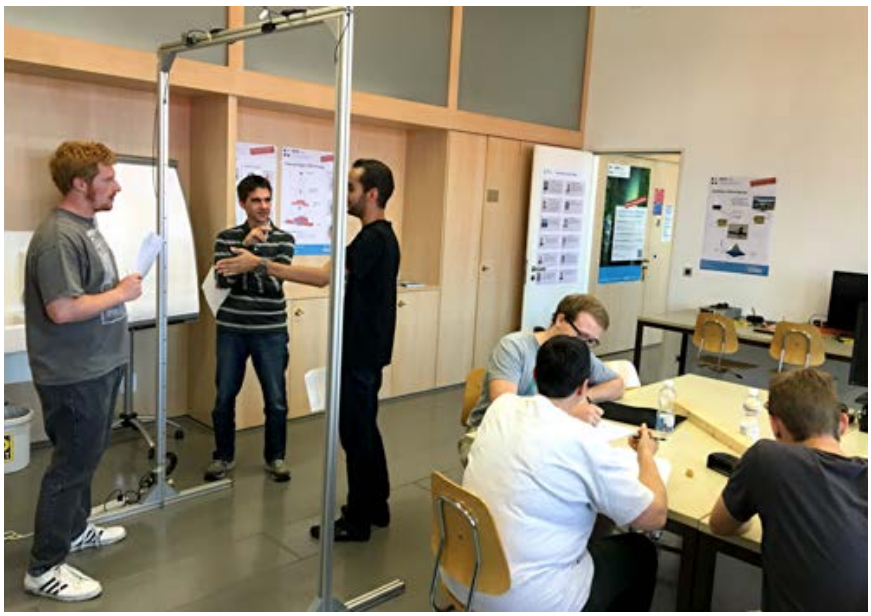
**University of Applied Sciences Eastern Switzerland, FHO**

*The HTW Chur is located in the Eastern part of Switzerland. This area of the Rhine valley, also called "photonics-valley", is a technology cluster of innovative companies in the field of optics and electronics. As the industry is growing rapidly, there is a shortage of well-educated photonics engineers. Just under 30 young men and women picked-up their studies as future photonics engineers this fall.*

With the new bachelor in photonics program, the HTW Chur is recognizing the growing importance of photonics. The program was developed in close collaboration with photonics companies and Swissmem (the Swiss association of mechanical and electrical engineering industries) and has a strong focus on practical training and a close connection to the industry. Supported by almost thirty industrial partners and an excellent network, valuable input was collected and used to develop different job descriptions and a complete curriculum, which reflect the needs of the Swiss photonics industry.

The partnering companies further support the HTW Chur by offering access to their special photonics equipment, by providing projects and bachelor themes, by organizing excursions, by promoting the bachelor program and, most importantly, by letting their own specialists teach the students directly on various topics. This exchange results in a bachelor program with a strong connection to the industry that perfectly combines theory with practical training.

more (in German)



## Project: Making aircraft lighter with powerline communication

**Lucerne University of Applied Sciences and Arts (Hochschule Luzern)**

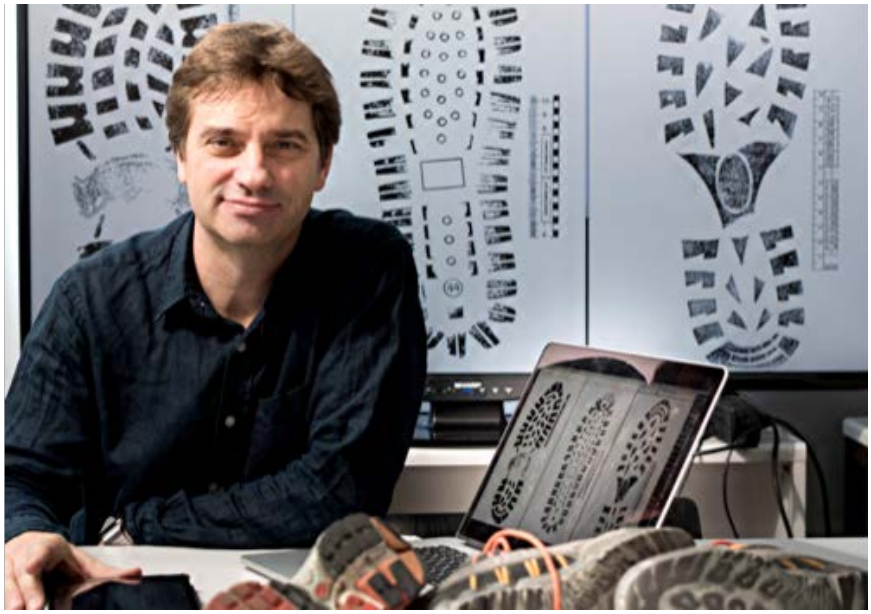
*Engineers at the Lucerne University of Applied Sciences and Arts foresee bringing powerline communication (PLC) on board an aircraft. PLC enables the data transmission via the power distribution network which makes it possible to eliminate large quantities of separate data cables, enabling significant savings in aircraft wiring weight, volume and complexity. For example, in an Airbus 380 with over 500 kilometers of wire, PLC can lead to weight savings of up to a ton.*

To make PLC available for aircraft systems, the Lucerne University of Applied Sciences and Arts has developed its own PLC technology platform under the name PLUS (Power Line data bUS). PLUS has been specifically designed to meet the requirements of even the most critical aircraft systems. For that goal, the PLC network must provide reliable, real-time and deterministic data transmission. Although the technical feasibility of PLC for such applications has been sucessfully demonstrated, the aviation safety certification of such a new technology will last longer which is typical for any new technology. Therefore, it will still take several years until the first aircraft with PLC will be ready for take-off.

---

## Project: Intelligent shoe print matching

**Lucerne University of Applied Sciences and Arts (Hochschule Luzern)**



*Most offenders leave shoe prints at the crime scene. That's why a fast and reliable way to identify and match shoe prints is important for efficient police work. A team from the Lucerne University of Applied Sciences and Arts worked closely with the Computer Vision Research Group from the University of Basel and forensity AG to develop a computer assisted Shoe Track Matching System.*

"Fast – Find and Share Tracks" is the first system using pattern recognition, hierarchical feature assignment and intelligent search routines to process shoe prints from crime scenes.

The software is able to deal with uncertainty of the visible features and patterns, for example the sole will change through wearing or it is not visible if a shape is oval or round. The user can express the uncertainty using a hierarchical system of features and the system will still find the best matches.

Once the correct sole profile has been determined, the system offers additional information and pictures of the shoe model, which can be used by investigators in the search for the offender. A web platform allows for inquiries with other police departments and matching with other cases where similar tracks were found. “FAST – Find and Share Tracks” saves time and money and facilitates efficient, standardized cross-border cooperation between police forces with a comprehensive database listing thousands of shoe models.

---

## Project: AutoPlay

**University of Applied Sciences and Arts of Southern Switzerland, SUPSI**

*The AutoPlay project is based on the fact that play is the children’s way of learning. An abnormal ludic behaviour is the first sign of social problems within the family and it is often a clear sign of possible neurodevelopmental disorders (i.e. autism, Asperger Syndrome, etc.). Consequently, pediatricians make use of play to interact with children and to regularly monitor their development. AutoPlay offers them a set of toys equipped with specific sensors that help detecting possible abnormal ludic development and facilitate early diagnosis and proper treatment, thus minimizing negative social impact.*

The embedded sensor nodes include accelerometer, gyroscope, humidity and temperature sensors. The toys are selected within the three sensory-motor classes of play (exploratory, relational and functional) and children can play with them in their natural environment (at home or nurseries). Data collection is based on a longitudinal study in order to correlate behavioral changes with the neuro development of the children.

AutoPlay is a collaboration among three different SUPSI Departments (Department of Business Economics, Health and Social Care, Department of Innovative Technologies and Department of Education and Learning), and it successfully combines technical, health and social sciences to bring innovation to society and to improve the quality of life.

## Project: App for tick prevention

**Zurich University of Applied Sciences, ZHAW**

*In Switzerland, there are 20 000 doctor's appointments every year concerning tick bites or tick-borne diseases. The "tick" app, developed in cooperation with the Swiss Federal Office of Public Health, the National Reference Centre for Tick-Borne Diseases and the Swiss League for Tick-Borne Diseases, can help prevent tick bites and identify Lyme disease infections.*

The app consists of a warning and an information section. Based on a dynamic map of risk areas, the warning function displays the current tick-risk in an area. The information section shows users how they can protect themselves from tick bites, how to correctly remove ticks and what to do after a tick bite is detected.

Tick bites can also be entered in the app's tick diary, which regularly reminds the users to check the tick bite location for Lyme disease symptoms. Quick detection of Lyme disease is important to prevent serious late complications. Data from the diary is anonymously transmitted to the "Citizen Science" network, helping developers to improve and further enhance the risk map for other users.

more


## Project: Revolutionising air traffic with in-flight fuelling

**Zurich University of Applied Sciences, ZHAW**

*Under the acronym RECREATE (REsearch for a CRuiser Enabled Air Transport Environment), the Centre for Aviation at the ZHAW School of Engineering investigated an in-flight fuelling concept for commercial jets. The aim is to allow*

*long-haul aircraft to take off with less fuel and only have their tanks filled up once they reach an altitude of 10,000 meters. According to the researchers' calculations, this concept would enable savings of around 20% of fuel consumption. To ensure that the fuel tanker aircraft does not simply use up the saved CO2 emissions, it would carry jet fuel for three to five commercial jets and circle a specific area.*

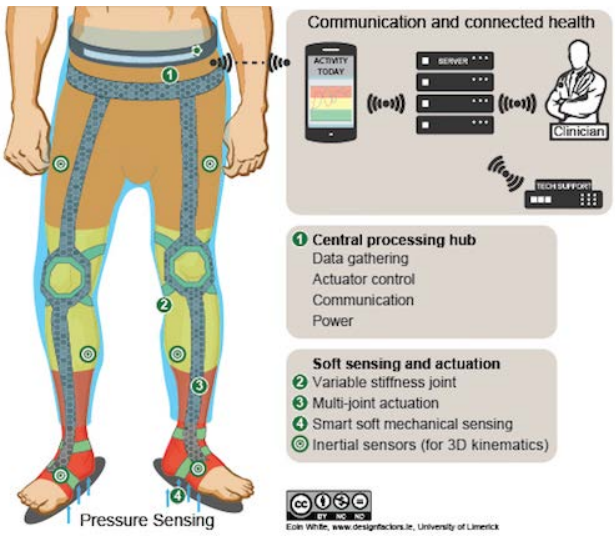
Besides reducing jet fuel expenditure, the concept also reduces noise emissions and ensures additional comfort for passengers. Even smaller aircraft could fly around the world without stopovers, which would relieve intercontinental aviation hubs. ZAV designed and constructed the tanker aircraft's cantilever arm in such a way that the fueling process in the air can be controlled completely by computer. This will allow civilian pilots to carry out the air-to-air fuelling manoeuvre without extra training.

more


## Project: Intelligent leggings for disabled people

**Zurich University of Applied Sciences, ZHAW**

*The overall aim of XoSoft, a multidisciplinary research and innovation action, is to develop an easy to wear, comfortable lower limb exoskeleton for elderly and disabled people with muscle weakness and/or a partial loss of sensory or motor function. The "intelligent leggings" can be worn daily to increase mobility and thereby improve health and quality of life.*




Unlike other supporting structures, the intelligent fabric developed with the XoSoft project is as thin as leggings or socks and can be discretely worn under the regular clothes. The soft exoskeleton is equipped with sensors that allow the integrated electronics to learn the movement pattern of an affected limb. This allows the structure to stiffen or soften at the right moment to support, relieve or freely move the limb. To ensure that the algorithms precisely identify individual postures and movement patterns, prototypes and software are undergoing extensive testing at the movement laboratory at the ZHAW's Institute of Physiotherapy.

more