FEMTOPRINT

The Idea
FEMTOPRINT® technology consists in a table-top 3D printer to produce glass microsystems with nano-scale features. It applies an ultrafast low power femtosecond laser to fused silica or other transparent substrates. The laser, focused inside glass, locally modifies the refractive index of the material and increase the etching rate. The result is the possibility to create 3D optical waveguides or 3D micro-nano pattern with a maskless process.

Solution
This simple process opens interesting new opportunities for a wide range of users to create their own micro-systems rapidly and without the need for expensive infrastructure. A broad variety of microsystems with feature sizes down to the nano-scale can be produced. These patterns can be used to form integrated optics components or be ‘developed’ by chemically etching to form 3D structures like fluidic channels and micro-mechanical components.

Worth noticing, sub-micron resolution can be achieved and sub-pattern smaller than the laser wavelength can be formed. Thanks to the low-energy required to pattern the glass, table-top femtosecond lasers not exceeding the volume of a shoe-box are sufficient to produce such micro- and nanosystems.

C A S E  S T U D Y

A SMARTPHONE APP AGAINST TICKS

Problem – Challenge
Approx. 9’700 accidents with ticks causing costs of 7.7 mio CHF are annually reported to insurers in Switzerland. Appropriate clothing and vaccination can prevent against tick bites and their consequences, however, not everyone active outdoors is vaccinated and up-to date with all relevant information how to deal with tick bites. In addition, the actual occurrence of ticks at specific location is highly variable and depends on the habitat conditions and local recent weather conditions. Providing interactive information on the actual occurrence of ticks at the individual location as well as basic information on the removal of ticks and symptoms of tick-borne diseases are valuable online support for all outdoor lovers.

Solution
In a CTI project and with additional funding from the Swiss and Liechtenstein’s Office of Public Health, researchers from the Institute of Natural Resources and Environment, ZHAW together with Andreas Garzotto GmbH developed an interactive tick-prevention-app. The central element of the app is a dynamic geographic risk mapping for tick bites based on biological, geographical and local weather. The prevalence of tick-borne diseases is not calculated, however local vaccination recommendations are given. How to remove a tick is explained and a “tick bite diary” helps to follow symptoms and gives advice if it is necessary to consult a doctor. A&K Strategy GmbH has been founded as ZHAW spin-off. The app “Zecke” is the first product of A&K Strategy GmbH, specialised in the application of “tick knowledge.”

C A S E  S T U D Y

In case of a tick bite, consequences and explanations of the next steps. A tick bite diary to register bites, inclusive Borrelia warnings chronologically after 5, 10 and 20 days. The dynamic, tick map with risk analysis functions, a innovation of A&K Strategy GmbH.