

burg giebichenstein university of art and design

industrial design department (ba)/visiting professor mareike gast

burg giebichenstein, founded in 1879, is a modern university of art and design combining elements of a design school, an art academy and a school of modern media.

the industrial design department's field of activity ranges from the development of realistic products up to the design of processes, interaction and programs. this can include the conception of action- and communication-strategies or services as well as the design of physical and digital products. design as a „method of innovation“ and „tool for innovation“ covers within research and education the awareness about the latest technological developments as well as the scientific results concerning the human in its natural and social environment.

mareike gast - industrial designer with a special focus on new materials and technologies - is teaching as a visiting professor for the summer semester at burg giebichenstein. it is her aim to create a bridge between the scientific research and development and industrial design in order to jointly develop innovative product.

semesterproject polytronics

electronic, autarkic products - printed like a newspaper

organic electronics, being one of the most promising fields in material and technology research, are especially interesting for industrial designers since their new possibilities will not just change the products but also their handling, interaction and service completely.

in saxony and saxony-anhalt, where halle is located, great research activities in the field of organic electronics are taking place. visiting several companies and institutes around halle was the starting point of this project.

having gained an insight in the current developments but also in the developments to be expected within the next years, the students were asked to develop and design ultra-lightweight, energy-autarkic, mobile and forward-looking products which make use of printed, organic electronics in their broadest sense.

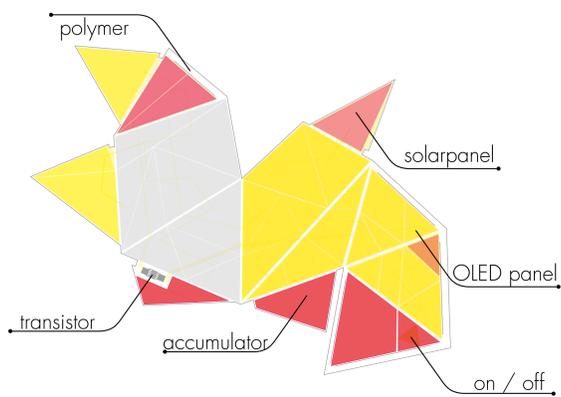
hereby questions arose, like: does a cheap technology like printing necessarily produce cheap disposables or how do printed high-end products look like? can a flexible substrate like paper or foil with organic electronics be shaped with traditional methods and what is the result of that contrast? how does the user interact with flexible electronics? what if printed organic electronics are recyclable or bio-degradable? how do products function and look like that are custom-printed? here you find the results.

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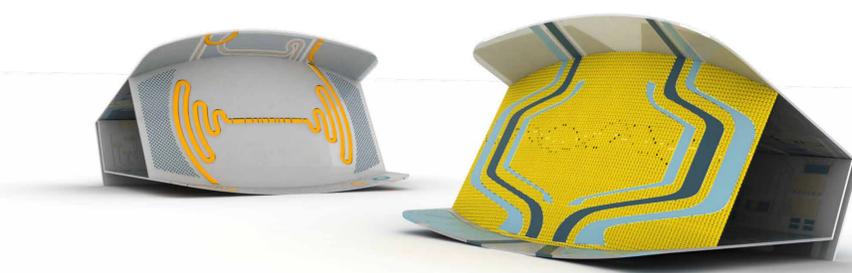
luxus • janis kanga • jnskan@gmail.com

luxus is an autarkic light. with it's different coloured lightpanels which come in various shapes, luxus blends in most diverse situations. as a reading lamp while camping or as a garden light while having dinner.

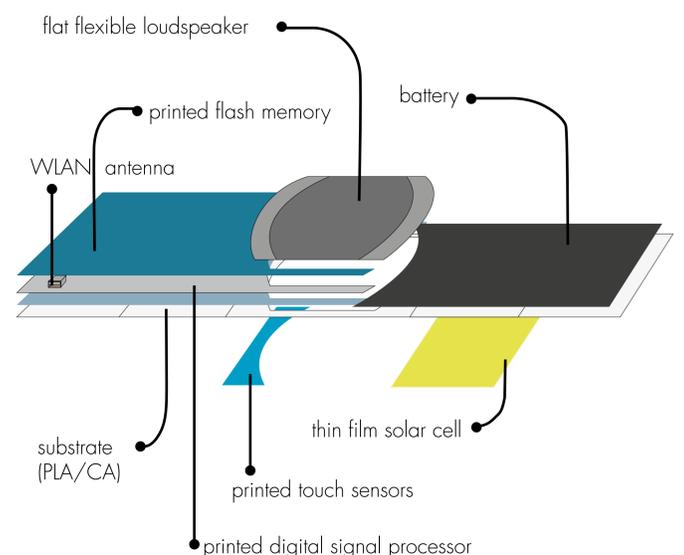
through the semitransparent solarmodules energy is produced during the day, which, saved in the accumulator, illuminates the semitransparent oled panels at night. luxus is made of printed electronics, which are sandwiched, laminated and punched out, to be folded along the perforation line by its owner.



pico • franz wagner • chimera.designz@googlemail.com



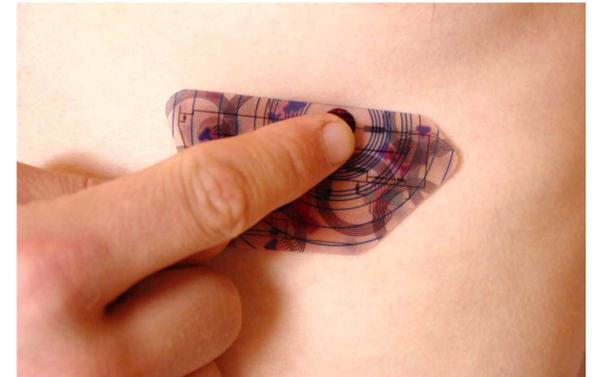
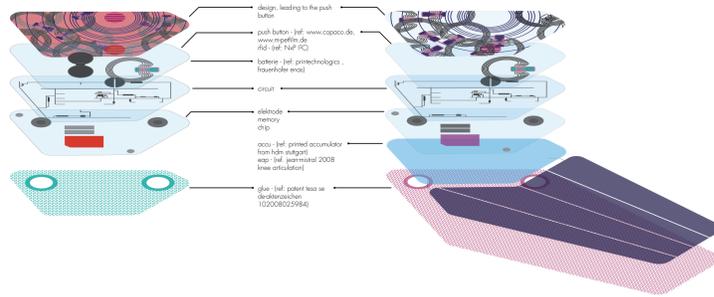
pico is a portable mp3 player that takes advantage of the light-weight and flexible printed electronics with a flat flexible loudspeaker (warwick audio technologies). it has pocket size, can be set up in one step and is self-sufficient due to several integrated thin film solar cells. its bracket-like shape allows the user to mount it on anything he wants, be it a bicycle, a table or a stick.





a cardiac event monitor is a medical diagnostic device like a long term eeg which is monitoring abnormal heart activity. the results get saved automatically and if the patient presses a button. the long recording time of 14 days is important to make a clear diagnosis from rare symptoms like arrhythmia or heart dis eases. the information get recalled by a doctor via rfid technology. the small patch is working with a printed battery while the bigger one is powered by printed electro active polymer, which generates power with the breathing and the expansion of the chest.

a printed cardiac event monitor frees the patient from the console and the cables, who belongs normally to an event monitor, because it sticks on the skin like a patch. made through an industrial printing processes the patch is a lot cheaper than normal portable eegs and so it can be used more often to make heart diagnostics.



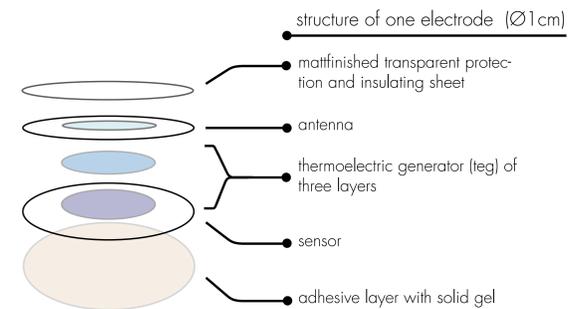
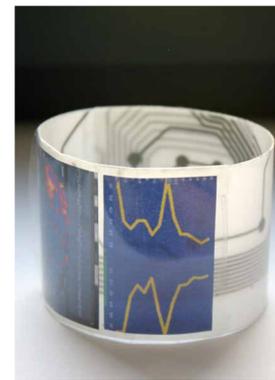
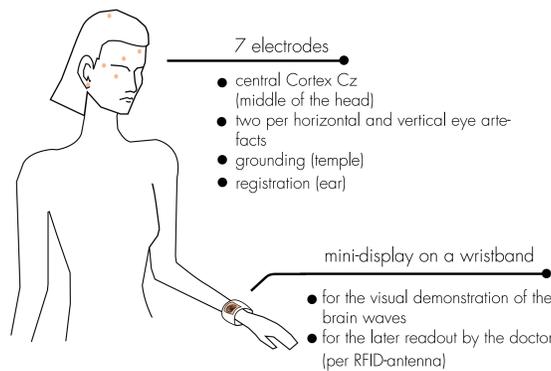
application

neuro mobile is a system, that trains the attention for perception of personal body signals. i designed it especially as self-backup-system for epileptic patients.

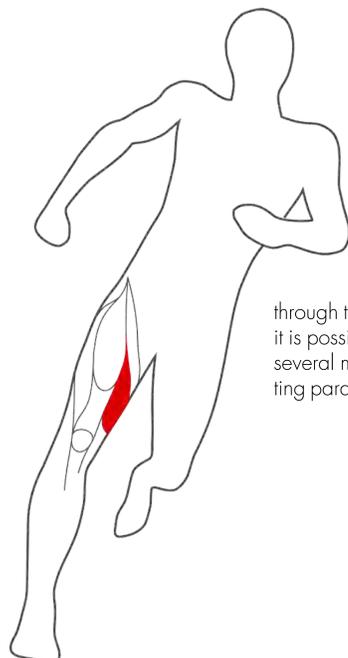
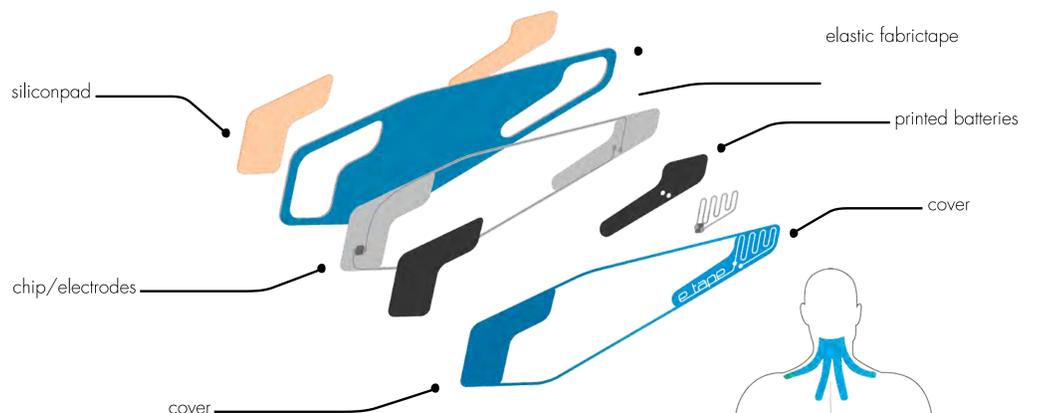
it is based on medical scientific expertise of biofeedback respective to the measure of electromagnetic brain waves (neurofeedback). because of the surface minimum of printed electronics, medical technology becomes more „transparent“ and „flexible“ and for that reason more accessible for patients. the inconspicuousness of just seven adhesive electrodes as well as the printed mini computer make neuro mobile to a long-term eeg which can be worn almost everywhere during weeks. the patient controls self-contained his therapy. people with neuronal disorders whose lives often are constricted can reach more autonomy. an epileptic person will become aware of situations and feelings which evokes seizures and can indirectly take influence by regulating himself through trained body and concentration measures. the person does not need to expose himself like when using other forms of medication or even invasive-operative changes. he can learn to react.

function

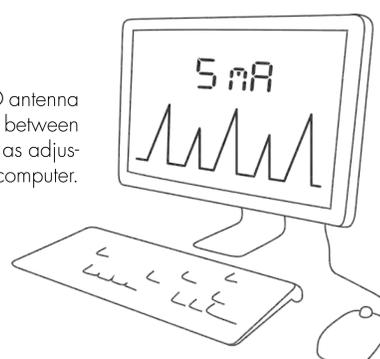
7 transparent printed silver-silverchlorid electrodes are required to register currents of the electric brain activity. the frequency will be amplified and sent via antenna from the electrodes to a mini-display, printed on a flexible foil wristband. over days and weeks the patient can identify own internal incidents by visual demonstration on his wristband, until he does not need this help anymore, because by the time he will get better in understanding his body signals. neuro mobile is a low power system. the electrodes are operating by thermoelectric generators.



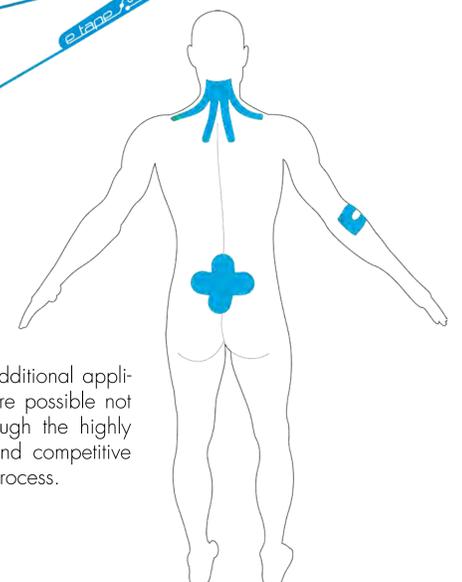
the e_tape combines the benefits of physio tapes with the performance of electrotherapeutics, but without the cable attached and on long term. based on an elastic tape it implements electrodes, the control circuit as well as the power supply in form of ultra-thin printed batteries. its operational area includes pain treatment, bettering of blood circulation and correction of tonicity.



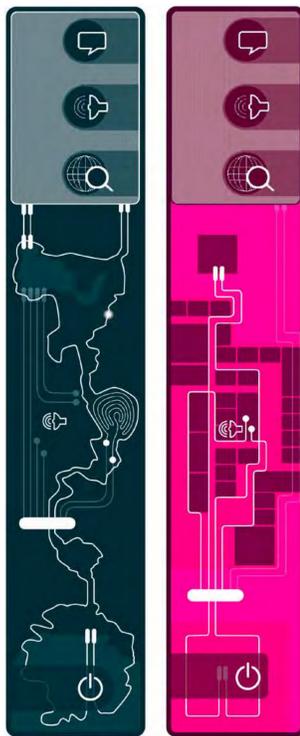
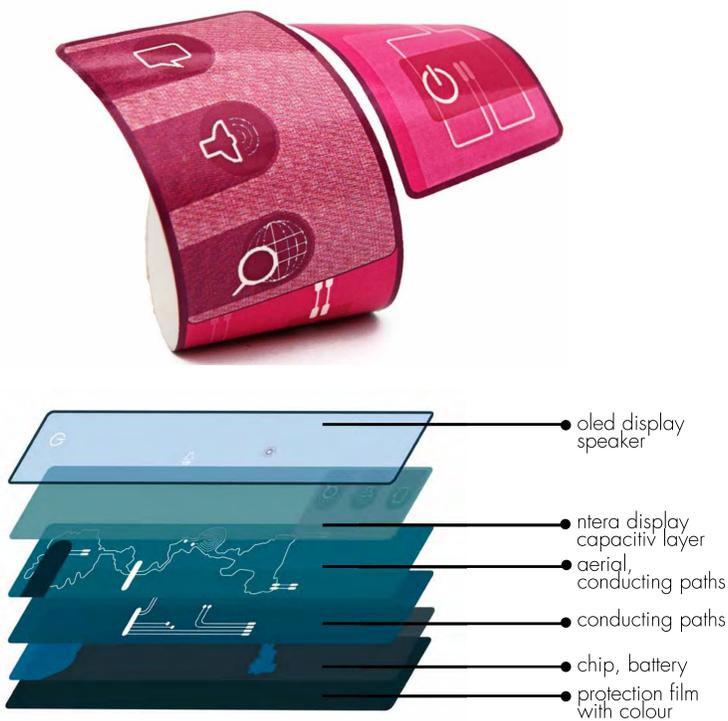
through the built-in RFID antenna it is possible to choose between several modes as well as adjusting parameters at the computer.



various additional applications are possible not least through the highly flexible and competitive printing process.



exemplarily shown here is a e_tape stimulating the musculus vastus medialis, which atrophies rapid during knee injuries leading to further troubles, it can be applied soon after operation without affecting constant immobilisation and warrants preservation of the musculoskeletal system.

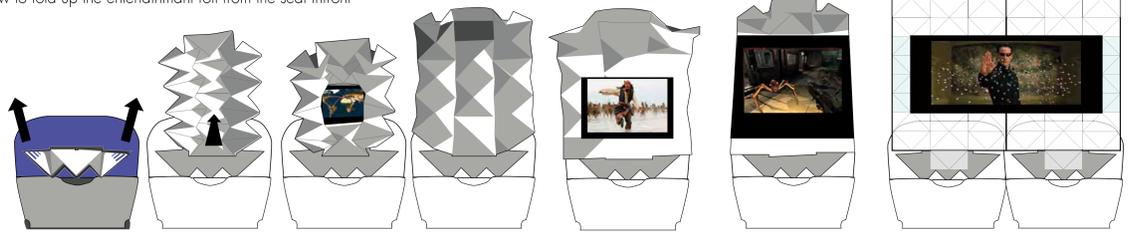


this handset is a tool for every visitor of exhibitions like a national park or temporary trade fair. you can use it like a navigation system to get information (for example about location, stands). additionally it functions as a ticket which you receive at the entrance. easily it can be placed around the arm and it fits on the shape of your wrist as a bracelet. in a national park you will have the possibility to navigate through the landscape by using the integrated touch display. an aerial registers your position and will help you to find the right way. if you hold the handset to your ear you can get more information about locational details. when finishing the tour you can keep it by your own or drop it down on the ground, because the material and the printed electronics are bio degradable and will leave a seed with a plant behind.

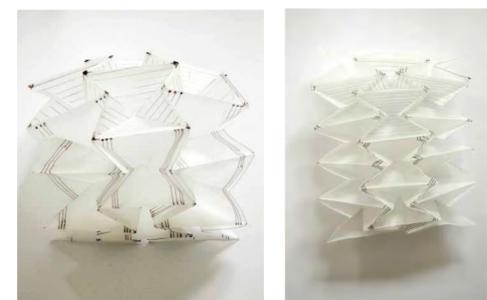
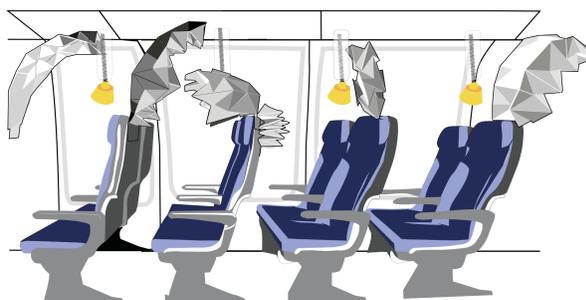
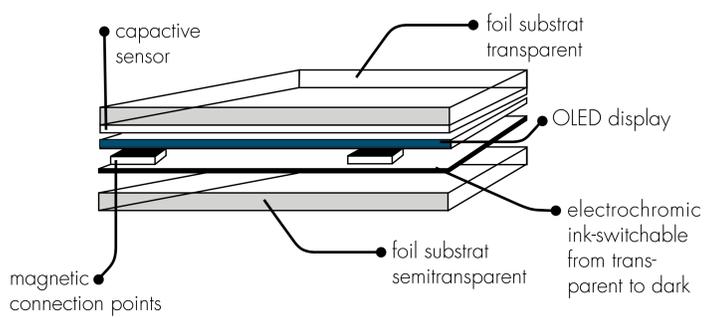
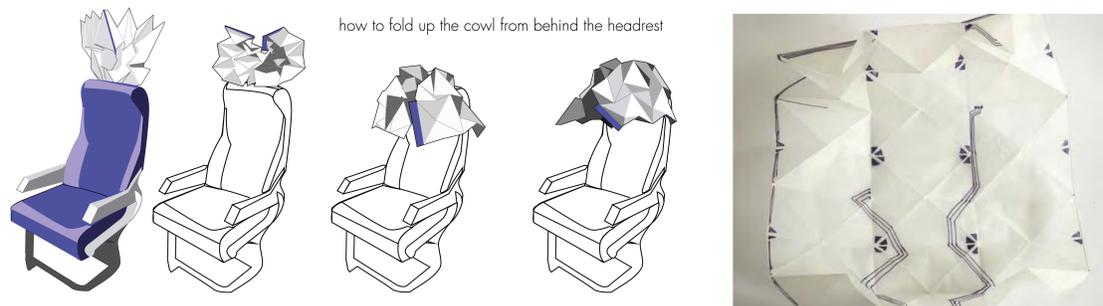


the e-cocoon gives the air passenger more privacy and entertainment in one. it consists of two parts - one attached to the front seat, one behind the head rest. both parts are made out of foil which can be folded. the folding pattern provides stability and geometrical flexibility. therefore the shape can be managed according to the passenger's requirements. small magnets support the back-folding so that the sheets can be hidden again. the longer part can be pulled up from the seat in front of you and includes a printed interactive OLED display. The display fields get activated by sensors when you flatten the square modules of the folding structure. displays can be combined once you connect your entertainment foil to that of your neighbour's. during long flights the semitransparent hood which belongs to each passenger creates a private space and encapsulates you from the crowded surroundings. this can be pulled out from behind your head rest.

how to fold up the entertainment foil from the seat in front



how to fold up the cowl from behind the headrest

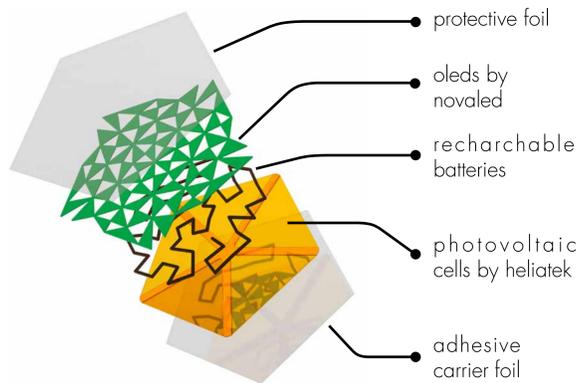


go glow • hannes trommer • hannes-trommer@gmx.de

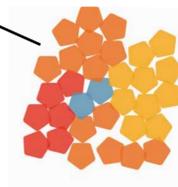
go glow is a sticker, which makes it possible to colour entire buildings. yet it only shows its hidden talents in the darkness. During the day it is only visible as a colourful, transparent foil. At nighttime go glow appears as a high-contrast area lighting.

Being a sticker you can apply go glow on nearly every surface. Even on old facades. Thereby it is possible to create large colourful surfaces, as well as lines and dots.

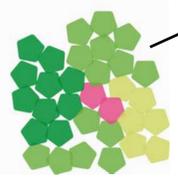
All of this becomes possible by applying organic electronics such as solarcells (Heliatek), a rechargeable battery and an OLED (Novaled). By rastering the OLED layer in relation to the solar layer, go glow works completely energy self-sufficient.



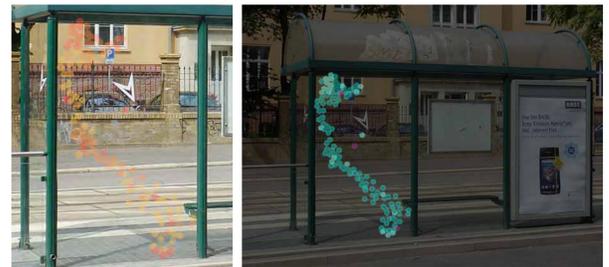
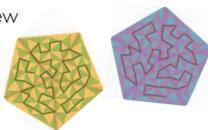
colour sample photovoltaic cells



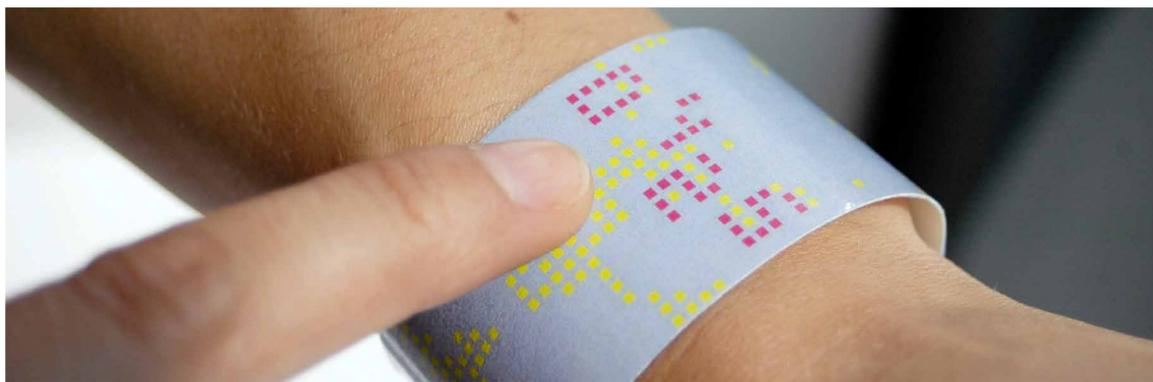
colour sample oleds



top view

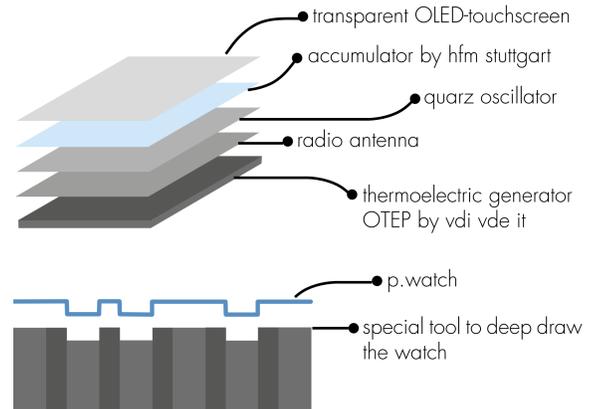
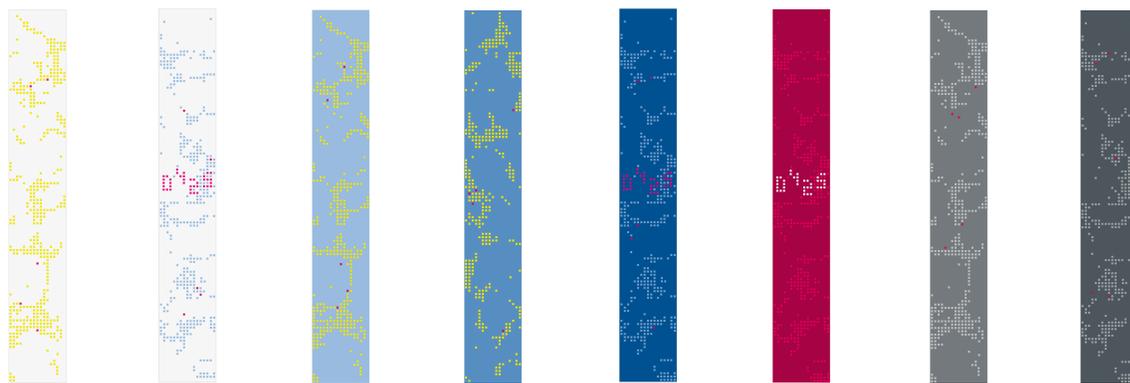


p.watch • amelie schleifenheimer • amelies.87@web.de



printed.polymer.personal.pixel.pattern.

the p.watch mainly consists of printed foil. every particular p.watch has a unique pixelpattern that is incidentally created by a pattern-generator. thereby every single one of it is customized personally. a printed thermoelectric generator harvests the required energy which is accumulated by a printed rechargeable battery. the current time is recieved by a printed radio antenna but is only pictured when the oled-display is touched. the pattern and the closing are both deep drawn. the entire shape of the watch can be formed in one work step. although the p.watch can be produced low priced however every single p.watch is one of a kind.



electric paper • laura christopheri • laura.christopheri@hotmail.de

a concept for electronic wallpaper with modular add-ons. this concept is based on the developments of the massachusetts institute of technology, who have started to print solar cells on paper. even though those organic cells currently only have an efficiency of 1.5%, this technology offers great potential and is therefore the foundation of my project.

the functional principle is quite simple. the wallpaper's whole surface is covered in solar cells and corresponding batteries, which are joined up with conductor tracks. on either side of the batteries there are docking stations for light and speaker elements, which allow the user to freely place and replace lights and speakers according to their taste and needs.

