INTERNATIONAL CONTEST OF INNOVATION

co-junction with TRANSDUCERS 2019

2019 23 - 27 June
Berlin, Germany

iCAN

iCAN **2018**
23-25, June
Hong Kong

DEADLINE: May 1st, 2019

Participants:

High school, Undergraduation, Graduate students
worldwide, 2–5 members/Team

Project:

Innovative prototype for better life

contact

Website: www.iCAN–contest.org

E–mail: iCAN@iCAN–contest.org

International Contest of innovAtioN

PROGRAM

www.iCAN-contest.org

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WELCOME TO iCAN

Welcome to the International Contest of InnovAtioN(iCAN'18).

iCAN intends to promote the innovative spirit of students in the world, to construct a collaboration platform between Education & Academy & Industry, and to create new applications for the nano–micro technologies. iCAN is globally co–organized by the Chinese International NEMS Society (CINS), Peking University and China Science & Technology Museum, VDE, IEEE NTC, ANF, MEMS Park Consortium and Nano–Tera.

iCAN started as a MEMS Application Contest in Mainland China at 2007 and extended to global at 2010 based on the great effort of students, professors and industries worldwide. The 1st international event, iCAN'10, was held in Xiamen, China in Jan. 2010. iCAN'11, 12 and 17 all held in Beijing, China. Then we had iCAN' 2013 in Barcelona, Spain, iCAN'14 in Sendai Japan, iCAN'15 in Alaska, USA and iCAN'16 in Paris, France. This year we luach iCAN'18 in Hongkong which is our 11th international innovation events.

Based on the success of the previous contest, iCAN'18 has attracted more than 5000 students in 20 countries to participate. Finally, 21 teams qualified from domestic contests to the final.

iCAN'18 will be held from 23 to 25 June, 2018 in Hongkong. It will be an exciting event of youth innovators and their exploration of a new world.

We believe, iCAN, You Can, We Can!

Haixia Zhang
General Chair
Peking University

Yikuen Lee
General Co-Chair
Hongkong University of
Science & Technology

Edward Byrne
Chair of Jury Borad
Swiss Foundation for Research
in Microtechnology

SCHEDULE

Time	Event	Venue
JUNE 23rd, Saturday		
12:00–18:00	Registration, Exhibition set up	Hallway outside LTJ, HKUST
18:00	Dinner	LG7, Academic Building, HKUST
JUNE 24th, Sunday		
9:00–10:30	Opening Ceremony, Exhibition Guest lecture speech	Lecture Theatre B (LTB), Academic Building, HKUST
10:30–11:00	Jury Meeting Group Photo	
11:00–12:00	Defense Presentation(Group A)	
12:00–13:00	Lunch Break	
13:00–14:30	Defense Presentation(Group B)	
14:30–16:00	Defense Presentation(Group C)	
16:00–17:00	Grading Exhibition	
18:00	Transfer to Crowne Plaza Hongkong Kowloon East	CROWNE PLAZA HONGKONG KOWLOON EAST
19:00	Award Ceremony	CROWNE PLAZA HONGKONG KOWLOON EAST
JUNE 25th, Monday		
09:00–12:00	Hong Kong Science Park & ASTRI	Hong Kong Science Park
12:00	The end of iCAN activity	

Defense Presentation Schedule

Group A
10:30–12:00, JUNE 24th

Number	Country	Project Name	University
A1	Thailand	REGENERATING CARTILAGE CELLS FOR A STRONGER KNEE	King Mongkut's Institute of Technology Ladkrabang
A2	China	Multi–Perception Robotic Gripper	Nanjing Agricultural University
A3	Germany	Chemical Cap	TECHNISCHE UNIVERSITÄT DARMSTADT
A4	France	NO'ZZ, THE MORNING COMPANION	ESIEE PARIS UNIVERSITÉ PARIS–EST
A5	Thailand	Agroribot: Making Agriculture Smarter and Reducing Agricultural Waste	King Mongkut's Institute of Technology Ladkrabang

Group B
13:00–14:30, JUNE 24th

Number	Country	Project Name	University
B1	Swiss	SLEEPIZ	ETH ZURICH
B2	Hong Kong	EXECUTIVE CHEF	HKUST
B3	Germany	HEAT IT	KARLSRUHE INSTITUTE OF TECHNOLOGY(KIT)
B4	Taiwan	I HEALTH I CARE	Taipei Medical University
B5	Thailand	Environmental Friendly and Machinable Lead–free Brass	King Mongkut's Institute of Technology Ladkrabang
B6	Japan	Intellgent bottle keeper	Inhikawa Gakuen Ichikawa Senior High School
B7	China	Aeroband Air Dial	University of Science & Technology Beijing
B8	France/Egypt	PORTABLE AIR QUALITY MORNITORING AND PURIFICATION	ESIEE PARIS UNIVERSITÉ PARIS–EST, FRANCE & AIN SHAMS UNIVERSITY, EGYPT
B9	Thailand	SUSTAINABLE REPLACEMENT OF ANTIBIOTICS AND PRESERVATIVES	King Mongkut's Institute of Technology Ladkrabang

Group C
14:30–16:00, JUNE 24th

Number	Country	Project Name	University
C1	Germany	Self–Balancing Bicycle	Hochschule Karlsruhe
C2	China	Single Camera Full–view Real–time Line Number Identification System	Aviation University of Air Force, Changchun University of Science and Technology, Jilin University
C3	Thailand	Cervical Cancer Cell Classification using Artificial Intelligen	King Mongkut's Institute of Technology Ladkrabang
C4	Germany	SmartFaraday	University of Freiburg
C5	China	3D gesture based remote control device	National University of Defense Technology
C6	Swiss	WEARit	Interstate University of Applied Science Buchs NTB
C7	Australia/China	Active Protection System Based on Visual Gesture Recognition	The University of Western Australia & Army Academy of Artillery and Air Defense
C8	Japan	TBT2	Kyoto University
C9	China	Electric Skateboard With Disk Brake and Bluetooth Remote Control	Chongqing University

ORGANIZERS

The Hong Kong University Of Science And Technology	香港科技大學 THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY
Peking University	
The University of Hong Kong	
ERA SPREAD LIMITED	ERA SPREAD LIMITED
REALMAX	REALMAX
MEMS Park Consortium Japan	MEMS
VDE (Association for Electrical, Electronic & Information Technologies), Germany	DVE
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HUATUO SENSORTEC	华托微电子
YFEN	YFEN 益丰电子
Alibaba Cloud	阿里云
SICIEI	SIC·IEI

AWARDS

Two teams will be voted as 1st prize and awarded 2000USD each, four teams for 2nd prize(1000USD) and eight teams as 3rd prize (500USD), other teams will get special gifts.

1st Prize 2000 USD/each (2)

2nd Prize 1000 USD/each (4)

3rd Prize 500 USD/each (8)

Criteria for rating

The contest pledges to be "Fair, Just, Open". The panel consists of experts in the field of Nano–Micro technologies from industry and academy. Experts with links to the competing teams are not allowed in the panel.

Criteria Rules:

○ Defense time: Each Team has 10 minutes, including 8 mins Presentation & 2 mins Q&A.

○ Criteria for Rating: Total 100 marks, Innovation (40%), Completeness (30%), Team work & others (30%).

Jury Board

Name	Title	Company/Organization
TED Byrne	Manager	Swiss Foundation for Research in Microtechnology
Peter Lee	CTO	Hong Kong NAMI Institute
Ruby Xiong	General Manager	Firefly Workshop
James Lei	Director	ASTRI (Hong Kong Applied Science and Technology Research Institute)
Weiping Zhang	CEO	Baosont Robot Group
Gregory U'Ren	Director of Technology	Xfab
Susan Shiu	Director	UBS GROUP AG
James Wu	Chief Scientific Officer	Shenzhen DJI
Jackie Tong	Senior Manager	ASTRI (Hong Kong Applied Science and Technology Research Institute)
Shanjuan Jiang	Managing Director	CICC Qianhai Development Fund Management Co.
Sting Wei	Senior Manager	TSI Semiconductor
Wilson Chong	Chairman	IOT HK ACCOCIATION
Sida Cheng	CEO	JYU
Alan Pun	Assistant MIS Manager	WAH SHING TOYS CO., LTD
Sunny Yee	Vice–President	International Unmanned Aircraft Systems Association (IUASA)
Liwei Huang	Chairman	Yuanju Capital
Xiang Rao	Chairman	AXON
Haitao Wang	Chairman & CEO	YINDING EDUCATION
Huijun Xu	President	Hainan Silk Road Institute of Marine Economy

Project Abstract

No.A1

Project Title: REGENERATING CARTILAGE CELLS FOR A STRONGER KNEE
Country (Region): Thailand
University: King Mongkut's Institute of Technology Ladkrabang
Team Members: WICHAYUT SUTTABONGOCH、THANYATHORN SATHIANS-
AOWAPORN、NATTAPHOL THANGCHIANG

Over 130 million individuals around the globe are suffering from osteoarthritis due to disorder of cartilage that happen from tears and injuries from daily activities and generic factors. The typical treatment today is knee replacement which is invasive (with Titanium implant) and slow in recovery. The existing stem cell therapy involves implanting cartilage which is cultured with chemical stimuli. We develop an innovative (simple and low cost) device that can regenerate and boost the performance of cartilage from patient's chondrocytes (cartilage cell) through applying Hydrostatic pressure. Mechanical stimulation applied by Hydrostatic pressure helps increasing proteins content in cells, boosting their performance to resist more load and improving flexibility compared with chemical stimulation that is used in regenerative medicine nowadays. Chondrocyte cultured with this device could recreate patient's cartilage which can be attached or injected back to their knees. Our research partner is Siriraj Hospital (JCI

accredited hospital) which provides pre-clinical resources and collaborates with us on further research on more degenerative joint diseases. Also our device has a potential to be a great plug-in into cell culturing process of cell therapy company to enhance their product quality.

No.A2

Project Title: Multi-perception Robotic Gripper
Country (Region): China
University: Nanjing Agricultural University
Team Members: JI QINJIE, WANG PENG

Different from the flexible hand on the market controlled by switching values, the multi-perception robotic gripper is a new type of flexible end effector, sensing information, controlled by force or distance. What's more, the gripper is made of flexible material and can grip items as human do . One gripper can suit a wide range of items what are different from qualities, shapes and sizes. In one word, the multi-perception can grip hard items as well as something soft.

No.A3

Project Title: Chemical Cap
Country (Region): Germany
University: ECHNISCHE UNIVERSITÄT DARMSTADT
Team Members: HENDRIK KAISER, NILS DEMUTH, IDA BLUM, YANNICK BENDEL, PATRICK WEIFENBACH

To ensure the correct use of any liquid chemical we invented the Chemical Cap. It secures typically used bottles in the chemical industry. Furthermore it monitors the use of the chemical and gives safety advisories for handling.

No.A4

Project Title: NO'ZZ, THE MORNING COMPANIO
Country (Region): France
University: ESIEE PARIS UNIVERSITÉ PARIS–EST
Team Members: MATHIEU LE MAUFF, LUC SIM

With the No'zz smart alarm clock, the wake–up becomes the best moment of the day!
No'zz always finds the best moment for you to wake up, using a sleep tracker placed on your bed. This wave free sensor analyses your body moves during your sleep and its algorithm selects the best moment to wake you up. With the Android app, you can fully customize your No'zz. You can select your favorite song, a traditional bip sound or even some music from nature (birds singing, waterfall...). You can also add reminders, watch the news and the weather forecast. Enter your work location and your schedule and No'zz will calculate the perfect time for you to wake up to be ready on time.
Using Google Maps, No'zz takes into account the traffic and warns you if there is an accident. Small and beau–tiful, No'zz fits in all bedrooms.
We won the ESIEE Paris "Innovation prize" for this project.

No.A5

Project Title: AGRORIBOT —Making Agriculture Smarter and Reducing Agricultural Waste
Country (Region): Thailand
University: King Mongkut's Institute of Technology Ladkrabang
Team Members: Natthanicha Jamroonpan 、Ratchatida Phummapooti、Supassara Bowman

Hundreds of tons of fruits are wasted during harvesting. Today fruits are either manually picked (slow and costly) or harvested by automation with a rigid gripper. To make automation more efficient and effective we have designed Agroribot. Agroribot is a soft gripper made by strong waterproof paper for robots inspired by the Japanese Origami art. Unlike current robotic grippers which has only three fingers, Agroribot has twelve fingers which increases the contact points allowing more efficient gripping. It can pick up objects of various sizes and shapes without requiring any additional sensory which other current robots are dependent on. It can grasp different type of fruits or items with the minimally sufficient grasping force that does not cause any fruits damage thanks to the origami design. Reducing and eliminating waste during harvesting creates significant environmental and economic benefits. With Agroribot, farmers have a higher quality of life by improving efficiency, saving time and decreasing risk during harvesting. We currently further develop the gripper with industrial partners to create the full automation harvesting system.
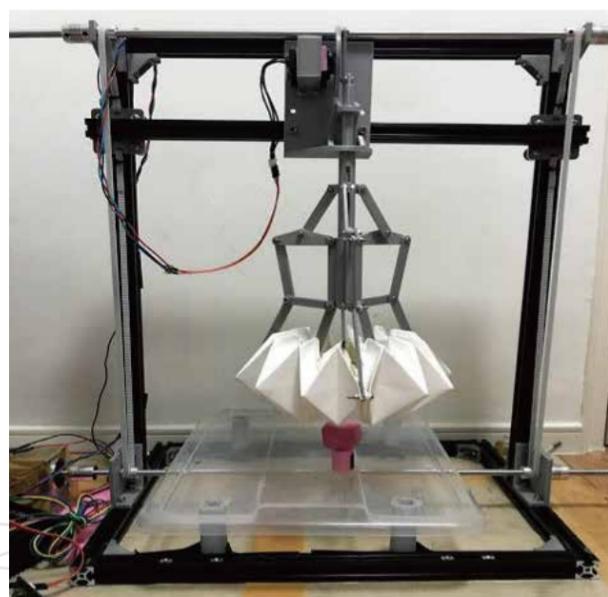
No.B1

Project Title: SLEEPIZ
Country (Region): Swiss
University: ETH ZURICH
Team Members: MAX SIEGHOLD, MARC RULLAN

Sleep is the activity humanity spends most time on, with 7 billion adherents practicing it for roughly 8 hours a day, every day of the year. This is because sleep is essential for a person's health and wellbeing. Yet, we rarely measure nor analyze it, even though 60% of adults report having sleep problems at least a few nights a week. The increased use of wearables is starting to change this trend by providing information on the user's sleep. However, measurements made by these devices are limited to heart rate and arm movement, which are not sufficient to give a complete picture of a person's sleep. We are developing a device using electromagnetic waves for the non–contact sensing of human vital signs, including breathing, heart–rate, and body movement, as well as sleep environment parameters. Such a product allows for an accurate quantification of a person's sleep quality, and to see if the person measured suffers from sleep disorders (e.g. sleep apnea, restless leg syndrome). Our prototype has been validated in a home and clinical setting, exhibiting a +95% correlation with the gold standard thereby demonstrating its medical use case.

No.B2

Project Title: EXECUTIVE CHEF
Country (Region): Hong Kong
University: The Hong Kong University Of Science And Technology
Team Members: LEUNG YUKCHING, LU ZHANGJI, QU YANG, SONG YUCHUN

Smart home devices have become a mainstream in everyday life to improve people's living standard. Kitchen always maintains an extremely important status in people's life as delicious foods not only satisfy people's appetite but also bring them joys and health. Despite the advantages of cooking, it has always been difficult to master cooking skills. Terrible cooking experiences such as getting cuts, prolonged cooking hours and over-seasoned dish, will easily hinder people from enjoying the joys of cooking. "Executive Chef" is an intelligent electrical equipment that improves cooking experience. Digital recipes are stored on the device and step-by-step guide will be provided to the user via LCD once a recipe is selected. The device can recognize the type and quantity of seasonings from the recipe and automatically load and weight them for the user such that the users can easily access to the exact quantity of seasonings in the recipe. The user can instruct and interact with the device through voice command. This non-contact human-machine interaction creates maximum flexibility to the users while they are handling food. The device is built from a combination of various sensors and actuators, including piezo-resistive sensor, temperature sensor, humidity sensor, voice recognition module, servo motor and solenoid valve. 'Executive Chef', your smart delicacy stewardship.

No.B3

Project Title: HEAT IT
Country (Region): Germany
University: KARLSRUHE INSTITUTE OF TECHNOLOGY(KIT)
**Team Members:** LUKAS LIEDTKE, STEFAN HOTZ, ARMIN MEYER, CHRISTOF REUTER

Heat it is a small, intelligent smartphone add-on (via USB) including and App which uses concentrated heat to cure mosquito bites, wasp stings and herpes. Other developments such as an UV-light sensor, alcohol tester and thermometer complete our set of smartphone add-ons.

No.B4

Project Title: I HEALTH I CARE
Country (Region): Taiwan
University: Taipei Medical university
Team Members: Ting-Yu Su

The integrated heart rate electromyography ultrasonic vascular image signal system platform was observed on the cloud flat-panel mobile phone. The platform consists of the most important and most urgently needed monitoring systems and observing the state of physical health. One year of an extended development study, including long-term chronic heart disease, cardiovascular disease, and physically disabled ethnic group members' body care in everyday life. All prevention work before the hospital can be done first. The platform extends to the development of daily life to capture physiological signals for record. And the recorded data was stored in the cloud. When the body feels unwell, it is compared with normal physiological signals. If the comparison with their own normal signals is not the same, the system platform will immediately send a message indicating "abnormal heart rate." This message is immediately known through the cloud doctor and can be understood. The device can monitor ECG and PPG signals at the same time. The sensor collects the weak ECG and PPG signals and converts them through the ADC of Arduino Leonardo. At the same time, the control number is transmitted via the HM-10 Bluetooth module. The user can use the Android device (mobile phone/ Tablet) to receive and monitor ECG and PPG signals from applications.
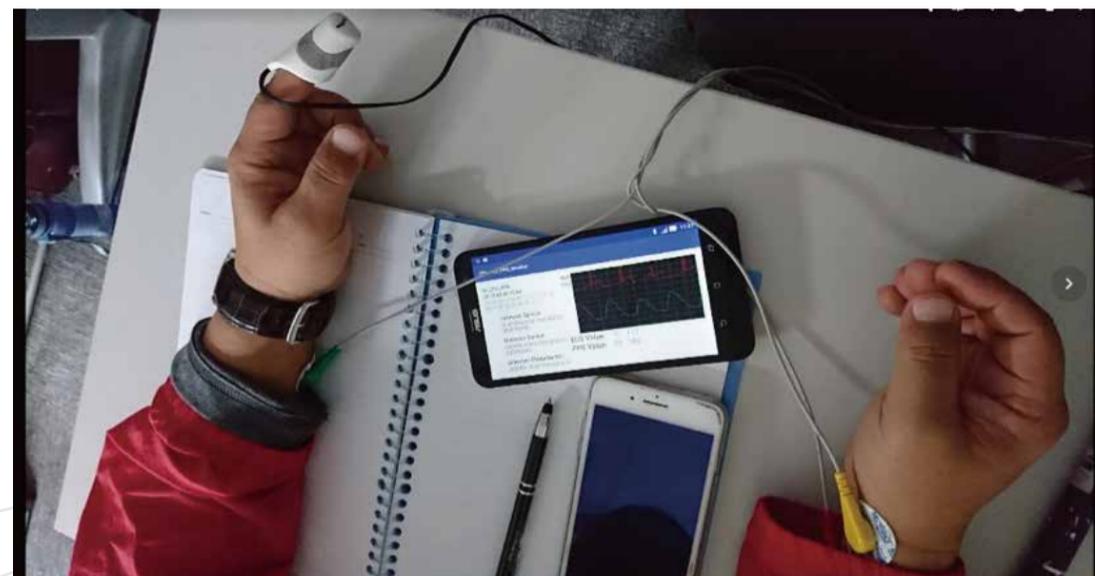

No.B5

Project Title: Environmental Friendly and Machinable Lead-free Brass
Country (Region): Thailand
University: King Mongkut's Institute of Technology Ladkrabang
Team Members: PEMIKA SUKSONGKARM、SIRINTRA JITCHOOM、KUNTHARA POONJARUWAT

Lead in drinking water is usually reached from plumbing such as pipes, fixtures, faucets and
fittings. Most water lines in the world are made of brass, which is an alloy of copper and zinc. Lead is added in the range of 1.5%-2.5% wt., into brass for easy machining. However, it is poisonous to human health and the environment. In recent years, NSF 16 have placed more restrictions on using lead in water-handling applications, especially portable water.
We have developed a nontoxic alternative brass, created using Bismuth and Tin alloys recycled
from electronic waste. Electronic waste is the serious environmental issue in the world which often processed through informal practices and unrefined process, causing serious environmental damage and health risks. Also, the cost of electronic waste refining process is high.
Our innovative technology solves two significant environmental issues at once. The manufacturing process is comparable to the conventional brass. The difference is we replace lead by Bi-Sn alloy, reused from electronic waste. Also, it has the properties that improve the machinability and the durability of the cutting tool which provide the higher productivity of mechanical production. Moreover, the lead-free brass costs much less than all the existing lead-free brass in the market due to the reusable element that being alloyed in brass. Our innovation enables user-friendly production process and reduce contamination in the environment and damage of human health.
Our technology has been validated by the Thai Industrial Standard (TIS) for significantly reducing the quantity of toxic elements (Pd, Cd, Zn) in water than the required standard.
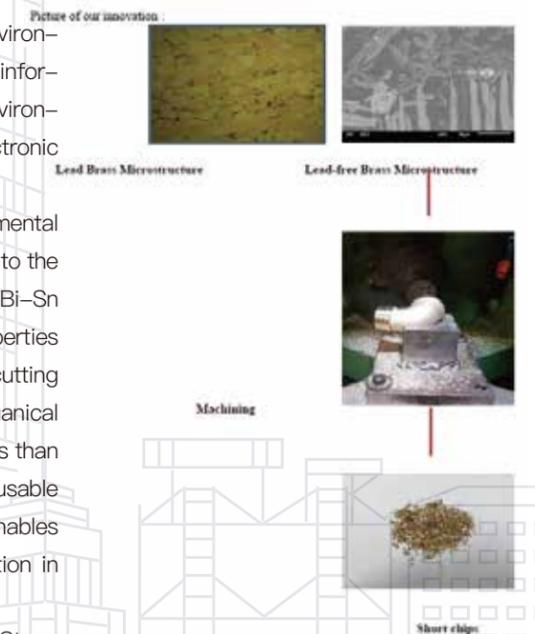
No.B6

Project Title: INTELLIGENT BOTTLE KEEPER
Country (Region): Japan
University: ICHIKAWA GAKUEN ICHIKAWA SENIOR HIGH SCHOOL
Team Members: KATSUMATA RINA, MASAI YUKA

This application was constructed for the purpose of helping people to avoid buying wasteful thing and forgetting to buy something necessary. To achieve the goal, the developed appliance as assumed to be used in a house refrigerator and to inform users away from home of the weight of groceries, such as drink bottles this time. The appliance was constructed to be installed easily and freely into the already using refrigerator. Two types of sensors are used in the application. One of them is a force sensor (Force Sensor UNIT HSFPAR303A) which is installed at the bottom of the container which are supposed to weigh bottles. The other is a temperature sensor (MEMS non-touched Temperature Sensor D6T-1A-01) which is installed on the side of the container to sense the opening and closing of the door of the refrigerator. The application sends the values of the sensors to the smartphone in real time through mobile communication system, therefore the users can check the situation in the refrigerator at home anytime and anywhere to see if they have something to buy.
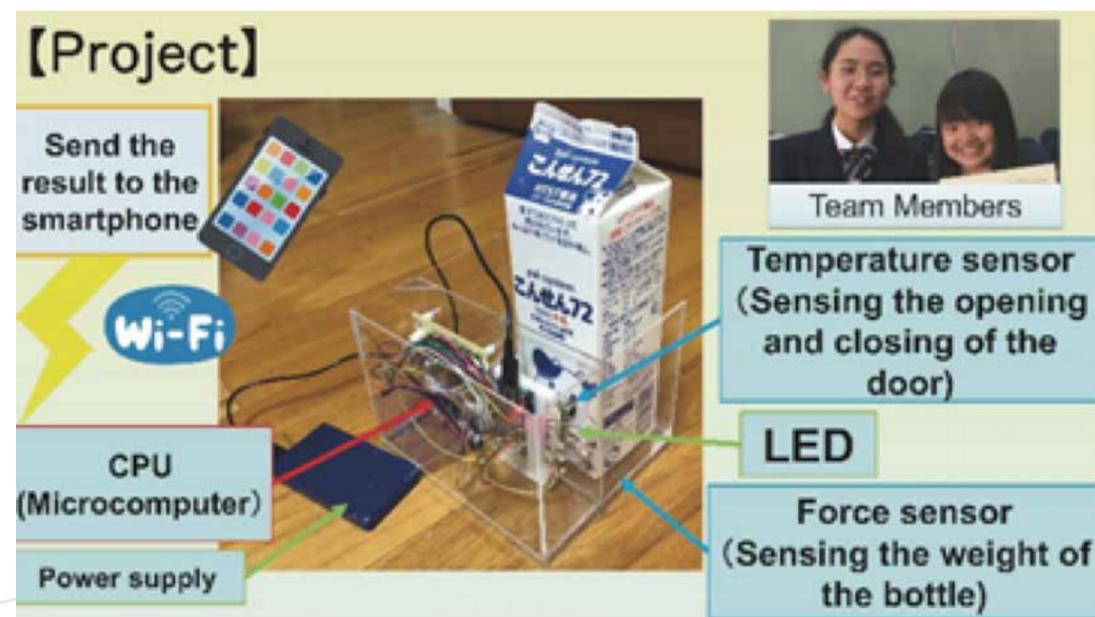
No.B7

Project Title: Aeroband Air Dial
Country (Region): China
University: University of Science & Technology Beijing
Team Members: NIU YAFENG, LIU BO, FANG ZILIN, WEI XIAN, WANG YINUO

Beijing Wearable Music technology co.LTD, established in January 2016,mainly engaged in intelligent body feeling music and new electric instruments.Our company aims to use technology to make users to quickly get started and playing music at anytime and anywhere.In 2015 ,our project won the first prize and RMB 150000 of bonus in the college innovation and entrepreneurship competition of China and the United States. At the same year, we have got the highest amount of RMB 200000 college students entrepreneurial guidance funds, as well as got the seed investment capital from PreAngel .So we startup our business at 2016.After one year research and develop-ment,our product will be launched at the end of 2017.Our main product is Aeroband – air guitar.It's an amazing intelligent simulation instrument.The user can use it to play guitar games and play the band with out any music skill.they just need to connect it to smart phone by bluetooth and shake their hand like play the real guitar.The price of our product is RMB 198,if you are interest in it ,you can visit our website aeroband.cn for more informa-tion.

No.B8

Project Title: PORTABLE AIR QUALITY MORNITORING AND PURIFICATION
Country (Region): France/Egypt
University: ESIEE PARIS UNIVERSITÉ PARIS-EST, FRANCE & AIN SHAMS UNIVERSITY, EGYPT
Team Members: MAZEN SAYED AHMED, AHMED ELSAYED

Air pollution is a leading cause of premature death in the world nowadays. This gives a large momentum to build portable gas sensors which fit different applications including industrial, medical, automotive, petro-chemical, and environmental applications. Motivated by the huge market for such portable low cost gas sensors, we developed a portable multi-gas sensor based on the world's smallest MEMS FT-IR spectrometer (NEOSPECTRA).

MEMS FT-IR spectrometers as a core building block for IR gas sensors have the advantage of low cost and small size beside the main advantages of optical gas sensing methods, which are higher sensitivity, shorter response time, absence of interaction with the target gas, and the ability to detect a wide range of gases simultaneously, along with their concentrations. In this project, we developed the 1st Mid Infra-Red (MIR) Michelson based MEMS spectrometer worldwide taking the advantage of the strong absorption of gases in the MIR range, also utilizing the wavelength range extension to measure different gases simultaneously such as CO_2, CO, H_2O, CH_4, etc. Also, a software is developed to make online monitoring of the CO_2 percentage in the air along the day as a quality indicator of the air. This prototype was developed in the frame of the RDI Programme funded by the European union "ENPI/2014/343-433". In addition to online monitoring of gases, we present air purification using ZnO nanowires as a photocatalyst. Air purification from harmful gases is presented showing the evolution of the purification with time.

No.B9

Project Title: SUSTAINABLE REPLACEMENT OF ANTIBIOTICS AND PRESERVATIVES
Country (Region): Thailand
University: King Mongkut's Institute of Technology Ladkrabang
TeamMembers: Pacharavajee Duangkaew、Neeranuch Rukying、Warunyou Niminram

According to the World Health Organization, by 2050 more than ten million people will die from antibiotic resistant. Extensive use of antibiotics and preservatives are causing several problematic issues, including customer rejection, trade barriers and antibiotic resistant pathogens in public health system. The peptide is produced by bacterial methods that minimizes the production costs and human health and environmental concerns. Nowadays peptides are expected to diminish the use of antibiotics and chemical preservatives and control the growth of microorganisms. The existing peptide production process is long, expensive and inefficient, involving high cost reactivation process. We have carefully redesigned and engineered a new gene to change the production process to produce active human peptides without reactivation process. Our innovation is protected by Thai patent application and we are told it will issue soon. When licensed to industry it will give a sustainable alternative to many antibiotic and preservatives that helps us walk through the dark era of the drug resistant microorganisms. We continue our research and development with industrial partner into applications in antibiotic-free drug, preservative free cosmetics and animal feeds.

No.C1

Project Title: Self Balancing Bicycle
Country (Region): Germany
University: Hochschule Karlsruhe
Team Members: Sören Alrutz, Philipp Kern, Philipp Schloer

Our transportation system has changed drastically in the past. Our possibilities have evolved, but also the expectations we have in them. Trains, cars and bikes are just a few options we have to get somewhere, which are unfortunately all far from being perfect. We wanted to create something that is on one hand environmentally friendly, easy to use and affordable for a wide variety of people, but provides a convenient solution for mass transport. As there is a big shift towards people using bikes more often, like in some european countries or for example China, we set ourselves the challenge of rethinking what a bike is in terms of transport. What we would like to present to you what we call the future of biking. A bike that is not much different than a standard bike from today, but makes your daily life much easier. Our bike is therefore able to balance itself and thus helps older people get on or saves you the hastle of getting on and off it at every intersection in traffic. In a later version the bike should also be able to follow its owner and can be called to get somewhere.

No.C2

Project Title: Single Camera Full–view Real–time Line Number Identification System
Country (Region): China
University: Aviation University of Air Force, Changchun University of Science and Technology, Jilin University
Team Members: LIU DEQIANG, ZHAO CHANGFU, CUI LINFAN, WANG CHEN, JIAN LINXI

Identification of line numbers is an essential part of integrated cabling for the aviation industry and the automotive industry. Line number identification was once manually detected and classified, which is relied on the naked eye of the worker to detect the string on the harness one by one to determine the harness application. But it has some disadvantages, including huge labor intensity, low efficiency, and unable to guarantee the quality of wiring. After the human eye recognizes the number of the harness, it will cause a serious accident once it is inconsistent with the wiring meter and applies it to the production. Based on the machine vision method, we propose a single camera full–view real–time line number identification technology, which can firmly make up for the deficiencies of traditional methods. As a non–destructive method, machine vision is used for the identification of line numbers, with good accuracy, high reliability and high–efficiency detection characteristics. Through image processing, pattern recognition and recognition, and classification, more real–time identification and classification of line numbers can be realized. After identifying the results, the database can be indexed and matched to the location where the line needs to be installed. Compared with the manual matching, the efficiency and accuracy are greatly improved, and the accuracy of the wiring is ensured to avoid the occurrence of failure.

No.C3

**Project Title:** Cervical Cancer Cell Classification using Artificial Intelligen
Country (Region): Thailand
University: King Mongkut's Institute of Technology Ladkrabang
Team Members: Aniwat Juhong, Supakorn Suwan

The aim of this work is to solve an unmet clinical need in fast diagnosis workflow in cervical cancer screening for low and middle income countries. We developed both a low-cost ultra-fast DSLR based whole slide imaging (DC-WSI) system with AI based cervical cancer cells classification. The DC-WSI system field of view achieves 22.6 times larger than that of the equivalent magnification of a conventional microscope system. The DC-WSI is capable of performing the whole slide scanning (2 cm2) under 4 seconds. The processing system for detect cervical used artificial intelligent type convolution neural network to detect cervical cancer from images (glass slide).

(1) DC-WSI system
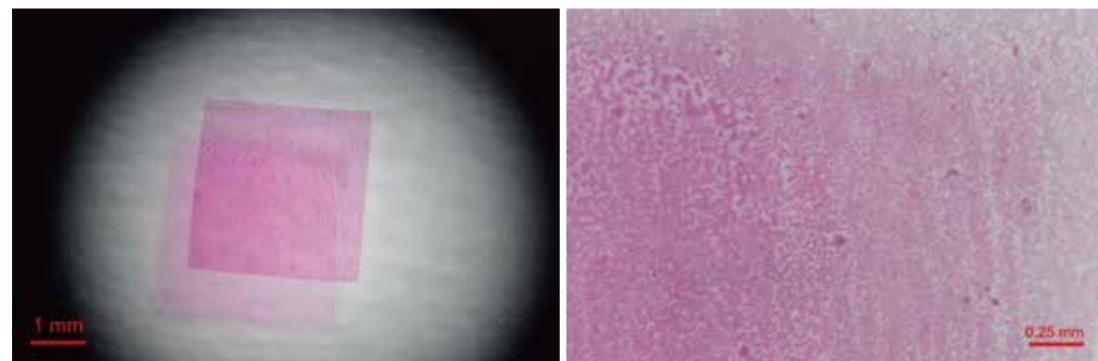
(2) An image of red blood cells with 3.5x zoom and b) An image of red blood cells with 10x zoom.

No.C4

Project Title: SmartFaraday
Country (Region): Germany
University: Hochschule Karlsruhe
Team Members: Konstantin Hoffmann, David Stork, Ann-Kathrin Leiting, Dominik Leclerc"SmartFaraday develops a smart and energy self-sufficient pedal for bicycles.

Tracking has not reached bicycles, yet.

Everyone is tracking their activities: the amount of steps per day, how many stairs were taken and where they have been during the day. Tracking for bicycles has no satisfying solution. Common systems consist of single measurement units and talk to a central device. To have an insight into the riding data, the **devices must be synchronized to a computer or smartphone.**

Thinking of security in case of **bike theft and accidents,** the common devices have no possibility to call for an emergency or notify the bike owner in case of a theft.

All-In-One device for everyone and everything.

The SmartFaraday Pedal is the solution. It combines every tracking feature in one product with the benefit of **energy self-sufficiency** and internet connection of the grid. It makes an old bike part of the **Internet of Things** via **NB-IoT.** Rides can track their speed, cadence, power, position, altitude and many more just by doing nothing — The SmartFaraday Pedal does its job and notifies the owner in case of a theft and calls an emergency contact in case of an accidents."

No.C5

Project Title: 3D gesture based remote control device
Country (Region): China
University: National University of Defense Technology
Team Members: ZHAO HANG, SUN YI, SUN SHENGYANG, LI JIWEI

This work is aimed at the drawbacks of existing control methods of mechanical arm, such as low flexibility, low precision, low sensitivity, complex operation, and designed an intelligent interactive manipulator based on hand gesture control. The system realizes intelligent interaction based on depth information of gestures, which provides a new way to manipulate for today's mechanical arm applications. Its control is more accurate and more flexible, and it can command complex mechanical movements with fewer simple instructions. The system consists of three parts: RGB and TOF sensors, computer and mechanical arm. The 3D sensor is composed of TI's depth camera, OPT8241 and OPT9221 controller. The final realization of the robot arm of the full play of bionics, as flexible as possible manpower developed. The follow-up work mainly focuses on the miniaturization of the system, the improvement of the identification rate and the improvement of the control stability.
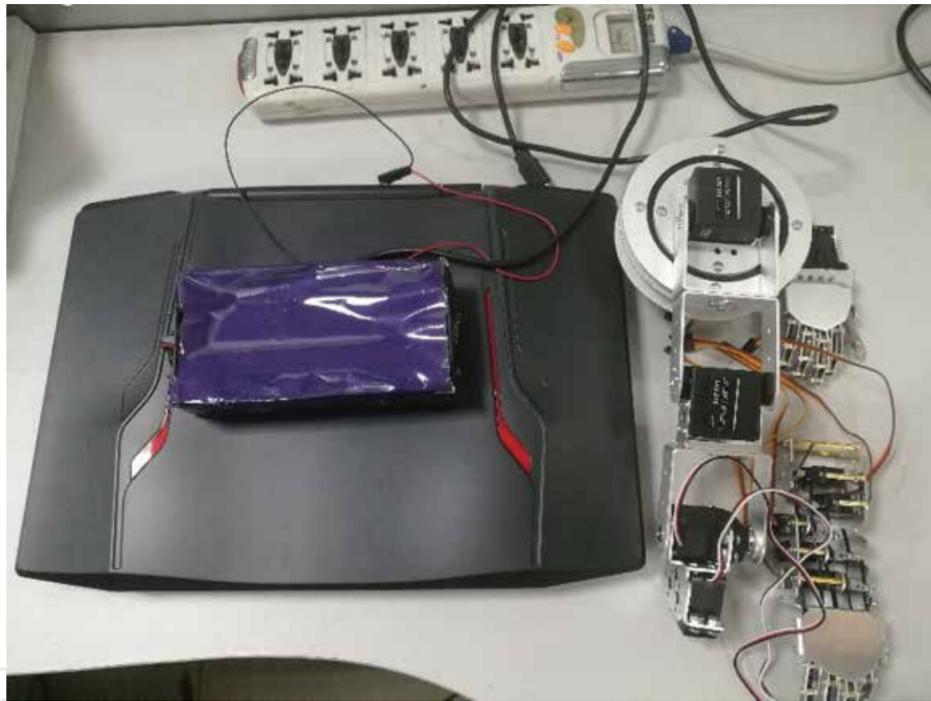
No.C6

Project Title: WEARit
Country(Region): SWISS
University: Interstate University of Applied Science Buchs NTB
Team Members: TANJA BLOCHLINGER, INDAY CARISCH, MORITZ, LAMMERICH, PHILIPP TREMUEL

Nowadays physical health and sports are an important part of our daily lifestyle. To reduce the risk of physiological damage and to optimize your fitness, it is necessary to get the most relevant information about our body. Physiological monitoring is also increasingly useful in baby- and elderly-care. Through optimized data use, risks can be detected early and long-term damages can be reduced. In recent years, the number of personalized health monitoring systems has increased rapidly. However, the cost to the user not only includes unnecessary expenditures on tracking of superfluous data, but also the loss of control over their own privacy. The technology behind current monitoring systems is based on high-tech wearable sensors. With different kinds of optical, electrochemical and biological sensors a huge amount of physiological data can be collected. Our vision is to give users the most relevant insights into their own health and fitness, as well as control over their own data.

No.C7

Project Title: Active Protection System Based on Visual Gesture Recognition
Country (Region): Australiaz/China
University: The University of Western Australia & Army Academy of Artillery and Air Defense
Team Members: LIU JIA, MA SHUCHEN, ZHAO ZIXUAN, JIANG YAN, ZHANG JUBO

An active defense system (ADS) based on visual gesture recognition The University of Auckland collaborates with a UAV Research Institute to develop a new generation of ADS based on visual gesture recognition. The system uses an infrared camera and a visible light camera to image. Computer vision is used to detect movable objects within the sight. It tracks and captures their motion trajectories and gestures, extracts their motion features for big database matching, thus accurately calculates targets' attributes and types. According to target types, light and sound defenses are used to drive away targets. In addition, individual characteristics can be accurately identi-fied by improving the algorithm and database capacity so as to replace fingerprint recognition, retina recognition etc. By upgrading low-cost sensor software, the system can identify and drive off suspicious targets as well as identify individuals. This will revolutionize the existing security equipment and greatly save the investment in secu-rity and human resources.

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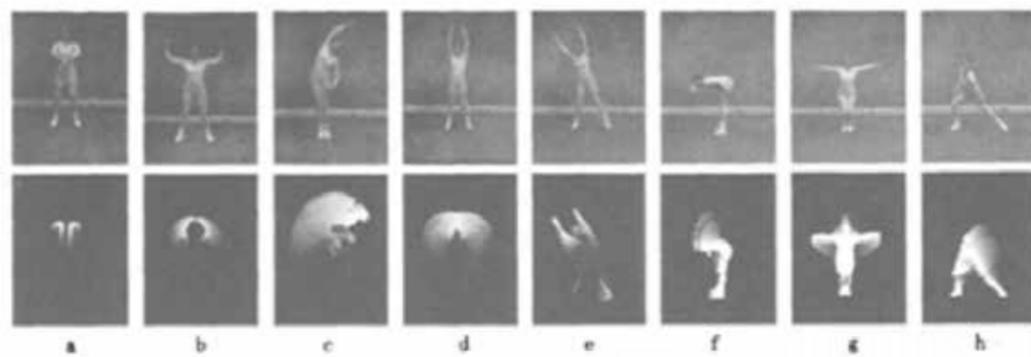
No.C8

Project Title: TBT2
Country (Region): Japan
University: Kyoto University
Team Members: Shimofuri Masaki、Obitani Kazutaka

Since it may be raining, I have to get up early ....
"SPIELRAUM ALARM" is an alarm clock that can set alarms according to the weather, and you can live a comfortable life by maximizing the preious sleeping time.
"SPIELRAUM ALARM" consists of a clock body and an outdoor sensor.Measure atmospheric pressure, temperature and humidity with the sensor and send data to the clock body over Bluetooth. Weather is judged based on these data.

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No.C9

Project Title: Super Electric skateboard with disk brake and Bluetooth remote control
Country (Region): China
University: Chongqing University
Team Members: CAI WEIZHEN, WANG YUXIANG, LU YUJIA, LIU SENHAO, CHENZOU JIAMIN

The project mainly involves research on six–generation skateboard. Each latter generation makes a more significant improvement in technical innovation than the previous one. For the fourth generation, we made brushless double drive, Bluetooth remote control and disc brakes which work through foot stepping and line transmitting, safer disc brakes. For the fifth–generation, we made oil pressure disc brakes; thus, we changed the braking transmission principle. As for the sixth–generation skateboard, we made wheels hubs motor, the carbon fiber surface integration technology. And we will achieve wheels hubs brake and Bluetooth control brake in our research, we drew 3 D for modeling, and also modified the program repeatedly. Moreover, we headed for the National Auto Test Field to have it tested until finally the board reached the agreed security standard, thus it has been completed like this today. The maximum speed of the electric skateboard is 30km/h, and the maximum braking distance is less than 5.5m. The project has obtained a national patent and has passed two national inspection reports. At the same time, it is also applying for the two invention patents.

Disk Brake