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Appendix

PolyU's winning projects at
"Inventions Geneva Evaluation Days – Virtual Event"

(1) Camera Pointing System for China's Lunar Exploration Missions (Chang'e 3 and 4)
Principal Investigator: Prof. Kai-leung YUNG Sir Sze-yuen Chung Professor in Precision Engineering, Director of Research Centre for Deep Space Explorations, Chair Professor of Precision Engineering and Associate Head, Department of Industrial and Systems Engineering

Installed on top of the lunar lander, it facilitates panoramic image capturing and rover movement observation on the moon, and helps construct a precision 3D model of the landscape for safe rovering. With a complex design and a weight of only 2.8 kg, it is sturdy enough to protect the camera against shock and vibration during the space mission and ensure its proper functioning under the extreme lunar environment.

The invention was completed and successfully deployed on the Moon front surface with the Chang'e 3 and Moon far side with the Chang'e 4 missions of China's Lunar Exploration Programme.

(2) UmiCool: an Eco-friendly Smart Sub-ambient Radiative Cooling (SSRC) Coating
Principal Investigator: Prof. Jianguo DAI Professor and Associate Head, Department of Civil and Environmental Engineering, Founder of Pro-Infra Science & Technology Limited (a PolyU Academic-led start-up)

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This eco-friendly, long-lasting, self-cleaning, low-cost polymeric radiative cooling coating can reduce the cools the interior temperature of buildings/infrastructure by 6°C as compared to the ambient temperature under direct sunlight without electricity consumption.

UmiCool can scatter sunlight, convert absorbed UV light to fluorescence emissions and re-emit infrared radiation to the cold universe.

(3) Carbon-negative Climate-smart Biochar Partition Block
Principal Investigator: Prof. Daniel Chiu-Wa TSANG Professor, Department of Civil and Environmental Engineering, Founder of NeutralCrete Limited (a PolyU Academic-led start-up)

World's first biochar partition block for indoor use that is lightweight, climate-smart, carbon-negative, thermal-insulating, noise-reducing, moisture-regulating and air-purifying.

With tailored biochar synthesis, cement formula and mixture design, this low-cost building material boasts high performance, high carbon sequestration and value-added environmental functions.

(4) Omni-Cool-Dry™: a Desert Beetle Inspired Skin-like Fabric for Dynamic Thermal and Moisture Management
Principal Investigator: Dr Dahua SHOU Assistant Professor, Institute of Textiles and Clothing

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Compared to normal fabrics, this fabric weighs 75% less, dissipates sweat 3 times faster, and is 50% less clingy during heavy perspiration. The wearer's skin temperature is also 5°C lower.

The skin-like fabric aims to keep wearers cool, dry and comfortable by dissipating sweat as water droplets, and by reflecting solar radiation and emitting body heat to the cold universe.

(5) AkkMore™: a Fungus and Plant Based Supplement Against Obesity or Prediabetes

Principal Investigator: Dr. Gail Jinhui CHANG Research Assistant Professor, Department of Applied Biology and Chemical Technology, Co-founder of Bo InnoHealth Biotechnology Company Limited (a PolyU GBA Start-up PostDoc and PolyU Academic-led startup)

AkkMore™ boosts Akkermansia muciniphila in human guts. It aims to improve users' body conditions by building a healthy microbiome. The fungus and plant based drink mix helps to reduce metabolic disorders and lose weight. The research team has completed three phases of animal testings - feeding mice with high fat diet and different doses of AkkMore™ for 12 weeks. Compared to the control group, the high-dose group showed improved glucose tolerance as their two-hour post-prandial blood glucose level has dropped by 20%. They also showed 25% lighter liver weight and 20% lighter body weight compared to the control group. Akkermansia muciniphila in the guts of the high-dose group has increased significantly, which could lead to improved metabolism and a healthy gut lining. The team has also completed phase 1 clinical trial in humans.

(6) Algorithmic Music Composition Software for Popularising AI Education

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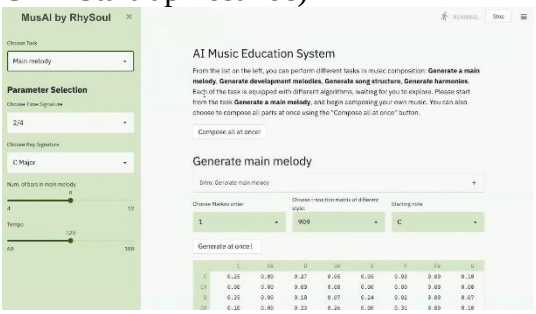
Principal Investigator: Dr Gong CHEN PhD alumni of the Department of Computing, Founder of RhySoul Technology (Shenzhen) Company Limited (a PolyU GBA Start-up PostDoc)



An interdisciplinary course that combines art and science. It teaches basic AI algorithms through experiential learning of AI-powered musical composition.
It aims to popularise AI education by enabling effective teaching at schools and self-learning, allowing beginners to learn basic AI algorithms easily in an interesting way. The software is now available in the market, and is being used by some secondary schools in China.