

PRESS RELEASE

Personalized Real-time Air Quality Informatics System for Exposure – Hong Kong (PRAISE-HK)

**HKUST NEW APP (PRAISE-HK) USES STREET-LEVEL AIR QUALITY DATA  
TO REDUCE PERSONAL EXPOSURE AND HEALTH RISK**

Real-time air quality analysis with higher than 90% accuracy

Street-level air quality maps powered by world-leading technologies

\*\*\*

**[HONG KONG] 21 June 2019:** HKUST Institute for the Environment today launched a new mobile app that aims to help users reduce their exposure to outdoor air pollution. PRAISE-HK stands for “Personalized Real-time Air-quality Informatics System for Exposure – Hong Kong” and will help build Hong Kong into a world-class smart and healthy city. Funded by HSBC 150th Anniversary Charity Program, PRAISE-HK is a five-year project commenced in November 2016, and covers three major release milestones for the mobile app and the system:

- (1) **Phase 1** – The app presented today (21 June 2019) is its phase 1 that profiles high-resolution outdoor air quality map down to street-level (with resolution down to 2-20 meter);
- (2) **Phase 2** – will provide full integration of personal exposure, tracking both outdoor and indoor air pollution levels including inside buildings or commuting;
- (3) **Phase 3** – will be an interaction app system that provides health prediction alerts based on personal responses to air pollution.

**What is PRAISE-HK?**

PRAISE-HK is a smart city app that provides state-of-the-art real-time and forecast (up to 48 hours) air quality and health risk information down to street level. PRAISE-HK shows Air Quality Health Index (AQHI) as well as percentage added short-term health risk (%AR) of daily hospital admissions attributable to criteria pollutants: nitrogen dioxide (NO<sub>2</sub>), ozone (O<sub>3</sub>), particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>), and sulphur dioxide (SO<sub>2</sub>).

The PRAISE-HK app is powered by a new system developed by cross-disciplinary experts led by the HKUST Institute for the Environment. The high accuracy performance is attributed to the following important technologies:

- (1) **Air quality and atmospheric model** – analyzes and forecasts air quality allowing for: dispersion of emissions released both regionally and in Hong Kong, and the associated complex photo-chemical reactions; and the influence on local pollutant dispersion of urban morphology in terms of building density and street ‘canyons’. The system generates street-scale resolution forecast maps (down to 2-20 meter) that highlight both pollution hotspots and areas of better air quality; fusion of modeled and measured concentration data ensures forecast accuracy.

INTERNAL - 1

- (2) **Traffic model** – tells us important road-side emission data from 30,000 Hong Kong road segments. The team developed a state-of-the-art microscopic activity-based traffic model, the first of its kind for Hong Kong, which captures the daily activity patterns of 4-million agents to derive the underlying traffic patterns across all modes of public transport as well as private car usage. The model produces detailed dynamic traffic patterns which are then used to estimate roadside emissions.
- (3) **Sensor technologies** – are developed with sophisticated hardware design and algorithm to reach the competent performance goals, and to fit the need for complicated microenvironment monitoring.
- (4) **Big data** – fills wide range of data gaps (from changing traffic speeds to special traffic incidents) to improve overall accuracy and to raise real-time performances;
- (5) **Air quality exposure science** – evaluates personal exposure profiles and associated health impacts; and
- (6) **Mobile technology** – identifies users' location either outdoor or indoor, in what kinds of buildings or transportation modes, so that PRAISE-HK system could analyze its personal exposure to the surrounding air quality.

Users can access this useful information on the PRAISE-HK app and take corresponding action, in particular, to reduce short-term exposure risks that makes a big difference for people who are sensitive to air pollution.

### Why PRAISE-HK?

Hong Kong's air pollution problem has improved significantly in the past few years but is still far from meeting the World Health Organization's Air Quality Guidelines. Hong Kong's official air quality monitoring network, limited to 16 fixed-site stations, is designed to measure the average air quality over different districts, but they cannot show the fine scale street-to-street air quality variations. This may give a false impression that there is little variation in air quality across the city, and that there is not much the public can do to avoid highly polluted areas.

In fact, as a result of different traffic and ventilation conditions, the air quality can vary widely from one street to another in dense urban cities like Hong Kong. The PRAISE-HK app maps air quality variation down to individual streets, allowing users to proactively plan their time and activities and reducing exposure from high pollution.

While air pollution is still a major environmental and health concern in Hong Kong, **Prof. Alexis Lau of HKUST Division of Environment and Sustainability, and PRAISE-HK Principal Investigator**, said "Many people believed that there is not much that can do to reduce their exposure to air pollutants. This is no longer true!"

By empowering the public with personalized air quality information, Lau believes PRAISE-HK can lead to a perception change in air pollution exposure, and can also drive behavior change in the public. "We have entered the Artificial Intelligence era. We could and we should combine innovations and new technologies to solutions for a smarter and healthier living style," Lau added.

PRAISE-HK is fully funded by the HSBC 150th Anniversary Charity Programme. **Mr. Patrick Humphris, Head of Communications, Asia-Pacific, HSBC**, said, “At HSBC, we have a long tradition of supporting the communities we serve, particularly here in Hong Kong. The integration of smart-city technologies into our lives will create smarter, healthier places to live and work. PRAISE-HK raises the profile of air pollution as a serious health hazard but also gives us the tools to manage our exposure. The real-time air quality data on the app will help us to protect our children, elderly and other vulnerable individuals. I am delighted that HSBC has supported HKUST’s work to develop this app through our 150th Anniversary Charity Programme.”

### PRAISE-HK App Features:



Home screen (front)	Home screen (back)	Air Quality Map	Bookmark page	Forecast videos
The “home screen” shows Air Quality Health Index (AQHI) of the user’s GPS-identified roadside location. Users can click the blinking health bubble to check the corresponding health advice.	Users can click the AQHI disc to show detailed pollutant composition with their attributed “percentage short-term added health risk” (&AR). Users can swipe the blinking forecast band to check the next 48-hour forecast at that particular location.	Users can access the “Street Level Air Quality Map” by tapping the “location icon” on the home screen, or via the side menu accessed from the hamburger menu icon on top left.	Users can bookmark personal locations and find out their current and predicted air quality with a single tap.	“Forecast Videos” page shows the varying air quality over four spatial scales. The animation illustrates the interactions between pollutant emissions (over land areas) and their transport by the weather systems.

[Visit website for details: <http://praise.ust.hk/index.php/about-praise/#app-instruction>]

### Download PRAISE-HK app:

- App Store: <https://itunes.apple.com/us/app/praise-hk/id1441509846?mt=8>
- Google Play: <https://play.google.com/store/apps/details?id=hkust.praise>
- App promo: <http://bit.ly/PRAISE-HK-App-promo>
- App features: <http://praise.ust.hk/index.php/about-praise/#app-instruction>

### Download the following press materials via [http://bit.ly/190621HKUST\\_PC](http://bit.ly/190621HKUST_PC):

- Bilingual press release
- English brochure
- PRAISE-HK App interface images
- Launching Ceremony event photos

### About Institute for the Environment: (IENV)

Institute for the Environment (IENV) is an interdisciplinary research institute of HKUST that promotes and conducts research aimed at improving the environment of Hong Kong, the Pearl River Delta (Greater Bay Area), and beyond. It has a solid track record in conducting air quality related studies in Hong Kong and the region. Its research findings have been adopted in many different ways in the policy making process both locally and regionally. IENV has gained tremendous support from the University on our research work and facilities (including the Atmospheric Research Center established in Guangdong in 2006). It collaborates with a variety of stakeholders, including academic, industrial and environmental non-governmental partners. It will continue to stretch our collaborative efforts and build cross-border synergies with mainland institutions for a greener and healthier Greater Bay Area.

PRAISE-HK website: <http://praise.ust.hk>

PRAISE-HK project promo (part 1): <https://youtu.be/3U3kXIKAKHo>

PRAISE-HK project promo (part 2): <https://youtu.be/kKMEYX8-p1s>

### Media Enquiries:

Ms. Rae Leung, Communications Manager (Environment)  
Institute for the Environment, The Hong Kong University of Science and Technology  
Office: +852 2358 8064  
Email: [raeleung@ust.hk](mailto:raeleung@ust.hk)

- ends -