

# PRESS RELEASE

# IIT Madras Researchers Develop Ultrasonic Waves-based Temperature Measurement Sensors for Industrial Furnaces

Patented in India and the U.S., this Industrial IoT Technology will greatly enhance the efficiency in Fertilizer, Petrochemical, Chemical and Manufacturing industries in India and Abroad

**CHENNAI, XX November 2020:** Indian Institute of Technology Madras Researchers have developed a disruptive sensor technology to greatly increase efficiency of industrial ovens in fertilizer, petrochemical, chemical and manufacturing sectors.

Called 'µTMapS' (or) 'Multi Point Temperature Measurement Sensor,' it provides automated and intelligent measurements that can replace existing heat process control systems that cause expensive forced shutdowns and early retirement of components well before its designed life.

High-temperature processes are critical to oil and gas, chemical, power generation and manufacturing industries. However, the control of these process has been a challenge due to the complexity in the processes. Currently, industries uses sparse measurements and the data are interpreted through manual intervention and/or operator intuitions.

IIT Madras Researchers at the <u>Centre for Non-destructive Evaluation</u> developed an Ultrasonic Waves-based temperature Measurement Sensors that can accurately measure temperatures in the range of -100°C to 1,400°C. This technology also generates data in real-time through Industrial Internet of Technology (IoT) devices, which will provide inputs to the industry to greatly improve their manufacturing processes and enhance their process efficiency.

Elaborating on this technology, Prof. Krishnan Balasubramaniam, Institute Professor, and Head, Centre for Non-destructive Evaluation, IIT Madras, said, "Any Industry that uses a lot of heat to process materials such as metals or polymers has to ensure that the entire furnace has uniform temperature across the board. This is critical to reduce defective products. However, existing technologies for this purpose have a lot of gaps and our Research Team at Centre for Non-destructive Evaluation set out to address these gaps."

**Further, Prof. Krishnan Balasubramaniam said**, "We have licensed our technology to an IIT Madras-incubated start-up called '<u>Xyma Analytics</u>,' which has been field testing the technology for the past one year in Indian industries to establish its reliability, performance and benefits. We plan to commercially introduce this technology for Indian and foreign manufacturing industries within the next one year."



The data generated by these sensors can be processed through Artificial Intelligence and Machine Learning to develop better designs for ovens and furnaces that can greatly reduce the cost and enhance efficiency for industries. **The Researchers have already been granted patents for this technology in India and the U.S.** 

**Speaking about the market potential for 'µTMapS,' Dr. Nishanth Raja, Chief Executive Officer, XYMA Analytics, said,** "We are looking at Indian and foreign markets, targeting industries that need industrial ovens at temperatures above 50°C. Our targets are refineries, fertilizer, petrochemical, chemical and manufacturing industries such as metal, steel, aluminium, glass, polymer and copper. The semiconductor industry is also of great interest to us as temperature control is important for this industry too."

IIT Madras Researchers have been working on this technology for more than two decades and many Intellectual Property (IPs) have come out already with several more in the pipeline. This technology utilizes ultrasonic waves in the frequency of 100 kHz to 300 kHz, which humans cannot hear.

The researchers use a wire embedded with sensor markings and install them in furnaces. As the ultrasonic wave travels through this wire, the sensor markings will measure the time and the feedback to calculate the temperature at different points of the furnace. A single wire can be more than 100 metres long and can cover an entire industrial furnace, with little footprint. Many industries now use several thermo-couples for this purpose. However, their range is limited and using a lot of thermo-couples results in higher footprint that can negatively impact the process.

The Industrial IoT technology reads the data detected by the sensors and transmits them in real-time. The air patterns in the furnace can be changed in real-time to make the heating more uniform. The history of the thermodynamics of these components can be used to figure out when the failure of a component can happen.

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# ABOUT IIT MADRAS

Indian Institute of Technology Madras (IITM) was established in 1959 by the Government of India as an 'Institute of National Importance.' The activities of the Institute in various fields of Science and Technology are carried out in 16 academic departments and several advanced interdisciplinary research academic centres. The Institute offers undergraduate and postgraduate programmes leading to B.Tech., M.Sc., M.B.A., M.Tech., M.S., and Ph.D., degrees in a variety of specialisations. IITM is a residential institute with more than 580 faculty and 9,500 students. Students from 18 countries are enrolled here. IITM fosters an active entrepreneurial culture with strong curricular support and through the IITM Incubation Cell.

IITM has been ranked No.1 in the '<u>Overall' Category</u> for the second consecutive year in India Ranking 2020 released by National Institutional Ranking Framework, Ministry of Education, Govt. of India. The Institute has also been ranked No.1 in the '<u>Engineering Institutions' category</u> in the same Rankings for five consecutive years – 2016, 2017, 2018, 2019 and 2020. It was also adjudged as the



'Top innovative Institution' in the country in Atal Ranking of Institutions on Innovation Achievements (ARIIA) in 2019 and 2020. ARIIA Ranking was launched by Innovation Cell of Ministry of Education.

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## MEDIA CONTACT FOR IIT MADRAS

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## **Print Coverage**

Date: 10th November 2020 Media: Deccan Chronicle (clip attached) Edition: Chennai Page No: 4 Journalist: NA **Headline: IIT develops disruptive sensor tech** 

# **Online Coverage**

Date: 10th November 2020 Media: The Economic Times Edition: Online Journalist: Sreeradha Basu Professor: Prof. Krishnan Balasubramaniam Headline: IIT Madras researchers develop ultrasonic waves-based temperature measurement sensors for industrial furnaces URL: <u>https://economictimes.indiatimes.com/news/science/iit-madras-researchers-</u> develop ultrasonic waves based temperature measurement sensors for industrial

develop-ultrasonic-waves-based-temperature-measurement-sensors-for-industrialfurnaces/articleshow/79125749.cms

Date: 10th November 2020 Media: The Hindu Edition: Online Journalist: NA **Headline: IIT-M develops new sensor for industrial ovens** URL: <u>https://www.thehindu.com/news/cities/chennai/iit-m-develops-new-sensor-for-</u> industrial-ovens/article33061650.ece

Date: 9th November 2020 Media: Deccan Herald Edition: Online Journalist: ETB Sivapriyan Professor: Prof. Krishnan Balasubramaniam Spokesperson Quoted: Dr. Nishanth Raja **Headline: IIT-M researchers develop technology to enhance industrial ovens** URL: <u>https://www.deccanherald.com/national/south/iit-m-researchers-develop-</u> technology-to-enhance-industrial-ovens-913368.html

Date: 9th November 2020 Media: The New Indian Express-EDEX Edition: Online Journalist: NA Professor: Prof. Krishnan Balasubramaniam Spokesperson Quoted: Dr. Nishanth Raja Headline: IIT Madras researchers develop ultrasonic waves-based temperature measurement sensors for industrial furnaces URL: <u>https://www.edexlive.com/news/2020/nov/09/iit-madras-researchers-develop-ultrasonic-waves-based-temperature-measurement-sensors-for-furnaces-15715.html</u>

Date: 10th November 2020 Media: DT Next Edition: Online Journalist: NA Professor: Prof. Krishnan Balasubramaniam Headline: IIT-M sensor tech to increase efficiency of industrial ovens URL: https://www.dtnext.in/News/City/2020/11/10052907/1261307/IITM-sensor-techto-increase-efficiency-of-industrial-.vpf

Date: 9th November 2020 Media: Money Control Edition: Online Journalist: NA Professor: Prof. Krishnan Balasubramaniam Headline: IIT-Madras researchers develop disruptive sensor technology to increase efficiency of industrial ovens: Report URL: https://www.moneycontrol.com/news/india/iit-madras-researchers-develop-

disruptive-sensor-technology-to-increase-efficiency-of-industrial-ovens-6093241.html

Date: 9th November 2020 Media: News Today Edition: Online Journalist: NA Professor: Prof. Krishnan Balasubramaniam Headline: IIT-Madras researchers develop temperature measurement sensors URL: https://newstodaynet.com/index.php/2020/11/09/iit-madras-researchersdevelop-temperature-measurement-sensors/

Date: 9th November 2020 Media: ABP Education Edition: Online Journalist: NA Professor: Prof. Krishnan Balasubramaniam Headline: IIT Madras researchers develop ultrasonic-wave-based temperature measurement sensors for industrial furnaces URL: https://www.abpeducation.com/news/iit-madras-researchers-developultrasonic-wave-based-temperature-measurement-sensors-for-industrial-

furnaces/cid/1205082?utm\_source=twitter&utm\_medium=social&utm\_campaign=a bpedu\_twit

Date: 9th November 2020 Media: ETV Bharat Edition: Online Journalist: NA Professor: Prof. Krishnan Balasubramaniam Spokesperson Quoted: Dr. Nishanth Raja Headline: IIT Madras researchers develop Ultrasonic waves-based temperature measurement sensors for industrial furnaces URL: <u>https://www.etvbharat.com/english/national/bharat/iit-madras-researchers-develop-ultrasonic-waves-based-temperature-measurement-sensors-for-industrial-furnaces/na20201109161952057</u>

Date: 9th November 2020 Media: Skill Outlook Edition: Online Journalist: NA Professor: Prof. Krishnan Balasubramaniam Spokesperson Quoted: Dr. Nishanth Raja **Headline: IIT Madras Researchers Develop Ultrasonic Waves-based Temperature Measurement Sensors for Industrial Furnaces** URL: https://skilloutlook.com/education/iit-madras-researchers-develop-ultrasonic-

waves-based-temperature-measurement-sensors-for-industrial-furnaces

Date: 9th November 2020 Media: Indian Education Diary Edition: Online Journalist: NA Professor: Prof. Krishnan Balasubramaniam Spokesperson Quoted: Dr. Nishanth Raja Headline: IIT Madras Researchers Develop Ultrasonic Waves-based Temperature Measurement Sensors for Industrial Furnaces

URL: <u>https://indiaeducationdiary.in/iit-madras-researchers-develop-ultrasonic-waves-based-temperature-measurement-sensors-for-industrial-furnaces/</u>

Date: 9th November 2020 Media: News Crater Edition: Online Journalist: NA Professor: Prof. Krishnan Balasubramaniam Headline: Temperature measurement sensors: IIT Madras researchers develop ultrasonic waves-based temperature measurement sensors for industrial furnaces URL: https://newscrater.com/temperature-measurement-sensors-iit-madrasresearchers-develop-ultrasonic-waves-based/

Date: 9th November 2020 Media: Daily Hunt Edition: Online Journalist: NA Professor: Prof. Krishnan Balasubramaniam Headline: IIT-Madras researchers develop disruptive sensor technology to increase efficiency of industrial ovens: Report URL: https://m.dailybunt.in/news/uge/epglish/moneytcontrol+epglish-epgper-

URL: <u>https://m.dailyhunt.in/news/uae/english/money+control+english-epaper-</u> <u>mconten/iit+madras+researchers+develop+disruptive+sensor+technology+to+incre</u> <u>ase+efficiency+of+industrial+ovens+report-newsid-n228184224</u>

Date: 9th November 2020 Media: Inshort Edition: Online Journalist: NA

# Headline: IIT Madras researchers make tech to increase industrial ovens' efficiency

URL: <u>https://inshorts.com/en/news/iit-madras-researchers-make-tech-to-increase-industrial-ovens-efficiency-1604943705292</u>

Date: 9th November 2020 Media: Knowledia Edition: Online Journalist: NA Professor: Prof. Krishnan Balasubramaniam **Headline: IIT Madras researchers develop ultrasonic waves-based temperature measurement sensors for industrial furnaces** URL: <u>https://news.knowledia.com/IN/en/articles/iit-madras-researchers-developultrasonic-waves-based-temperature-</u> <u>a373ff0d7582b6bac831e941b8dee390958c9035</u>

Date: 9th November 2020 Media: Emerging Technologies News Edition: Online Journalist: NA Professor: Prof. Krishnan Balasubramaniam Spokesperson Quoted: Dr. Nishanth Raja Headline: IIT Madras Researchers Develop Ultrasonic Waves-based Temperature Measurement Sensors for Industrial Furnaces URL: https://www.emergingtechnologiesnews.com/index.php/2020/11/09/iitmadras-researchers-develop-ultrasonic-waves-based-temperature-measurement

madras-researchers-develop-ultrasonic-waves-based-temperature-measurementsensors-for-industrial-furnaces-india-educationeducation-news-indiaeducationnews/

Date: 9th November 2020 Media: UR all News Edition: Online Journalist: NA Professor: Prof. Krishnan Balasubramaniam **Headline: Temperature measurement sensors: IIT Madras researchers develop ultrasonic waves-based temperature measurement sensors for industrial furnaces** URL: https://urallnews.com/temperature-measurement-sensors-iit-madrasresearchers-develop-ultrasonic-waves-based-temperature-measurement-sensors-forindustrial-furnaces/

Date: 9th November 2020 Media: News Mantra Edition: Online Journalist: NA Professor: Prof. Krishnan Balasubramaniam Headline: IIT Madras researchers develop ultrasonic waves-based temperature measurement sensors for industrial furnaces URL: https://www.thenewsmantra.com/iit-madras-researchers-develop-ultrasonicwaves-based-temperature-measurement-sensors-for-industrial-furnaces/





