Clearing the Air: Air Quality Research in India Using Low Cost Air Monitors

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Who We Are

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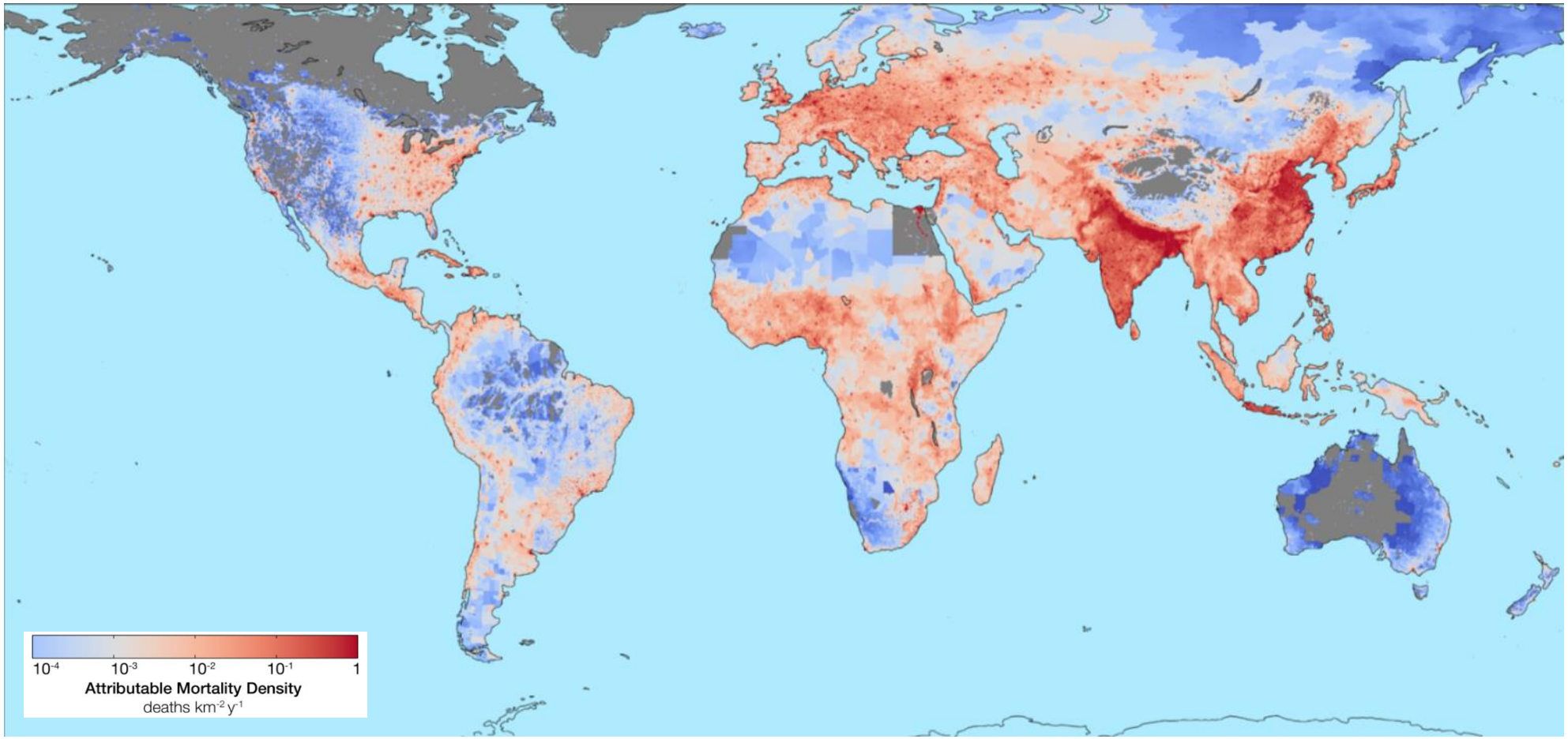
Meet our team.

Problem

The majority of deaths attributable to air pollution are concentrated in India and China.



Insufficient Data

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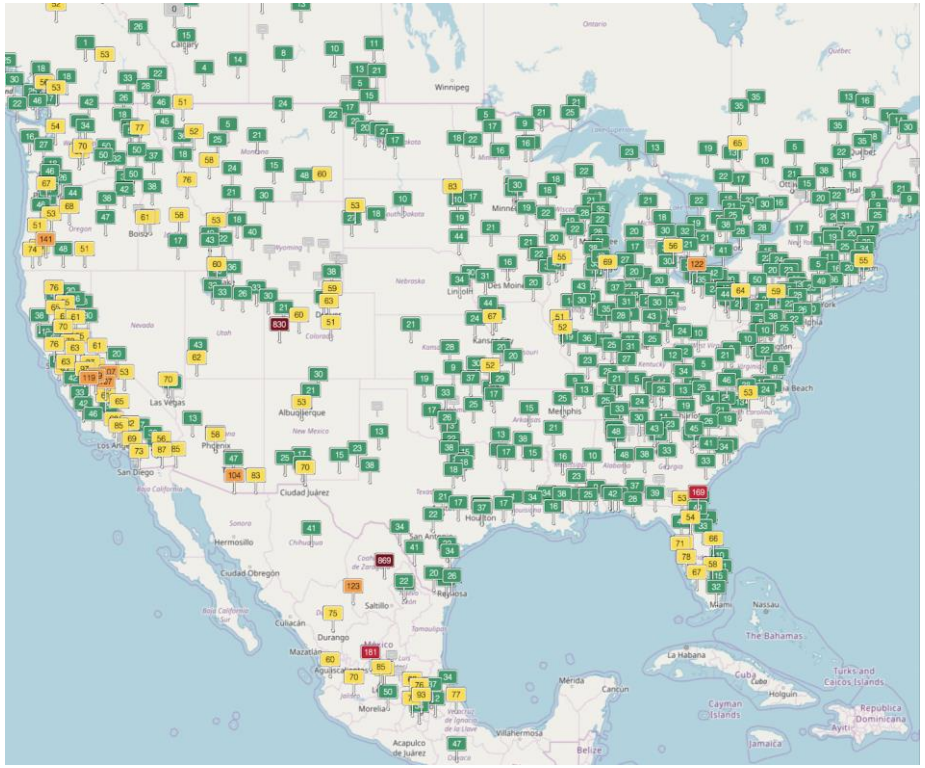
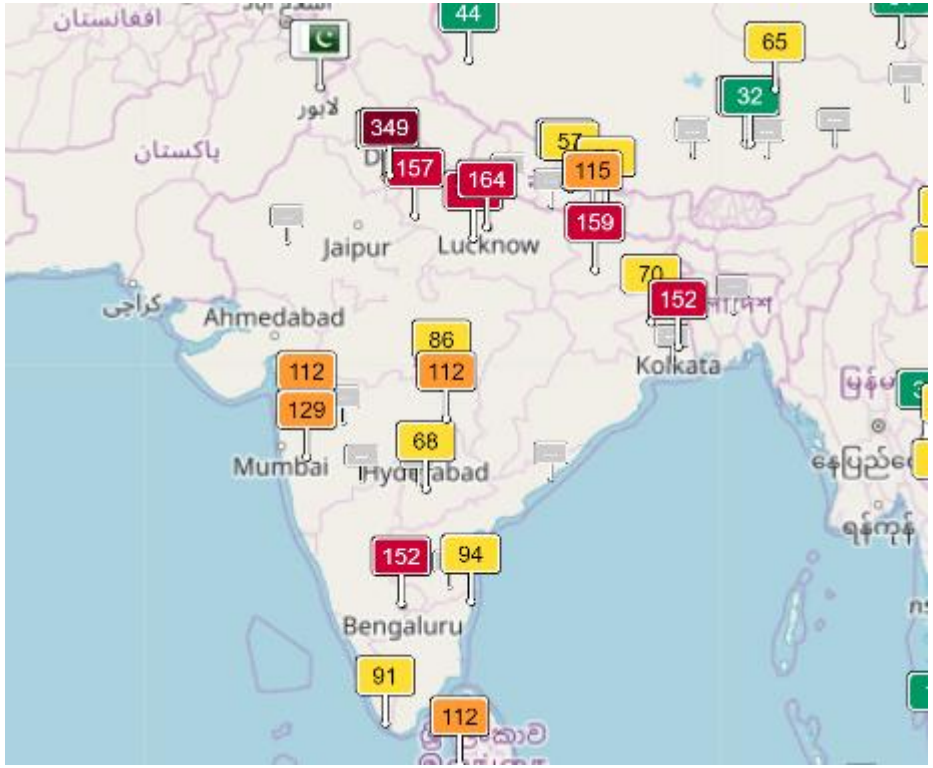
There is a lack of data to understand the problem.



Texas
250+ sites



India
< 100 sites

Low-cost sensors may be the solution

Conventional sensors can be cost-prohibitive; low-cost sensors present a possible alternative.

Conventional Sensors

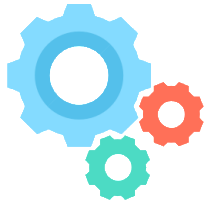
$100,000+

PurpleAir Sensors

$250

Research Questions

Three key questions.



How precise, accurate, and reliable are low-cost sensors in **real-world conditions?**

What processes affect how air pollution **vary in space and time** across Bangalore?

What barriers exist for **scaling up** low-cost pollution sensor networks?

Planning the Sensor Network for Bangalore

Each goal for the project.

Core Goal: Create an interactive air pollution map with low-cost senso

Goal 2: Correlate **sources and patterns** of air pollution across Bangalore

Goal 3: Document procedures developed and create a low-cost **deployment toolkit**

Interactive Low-Cost Sensor Network

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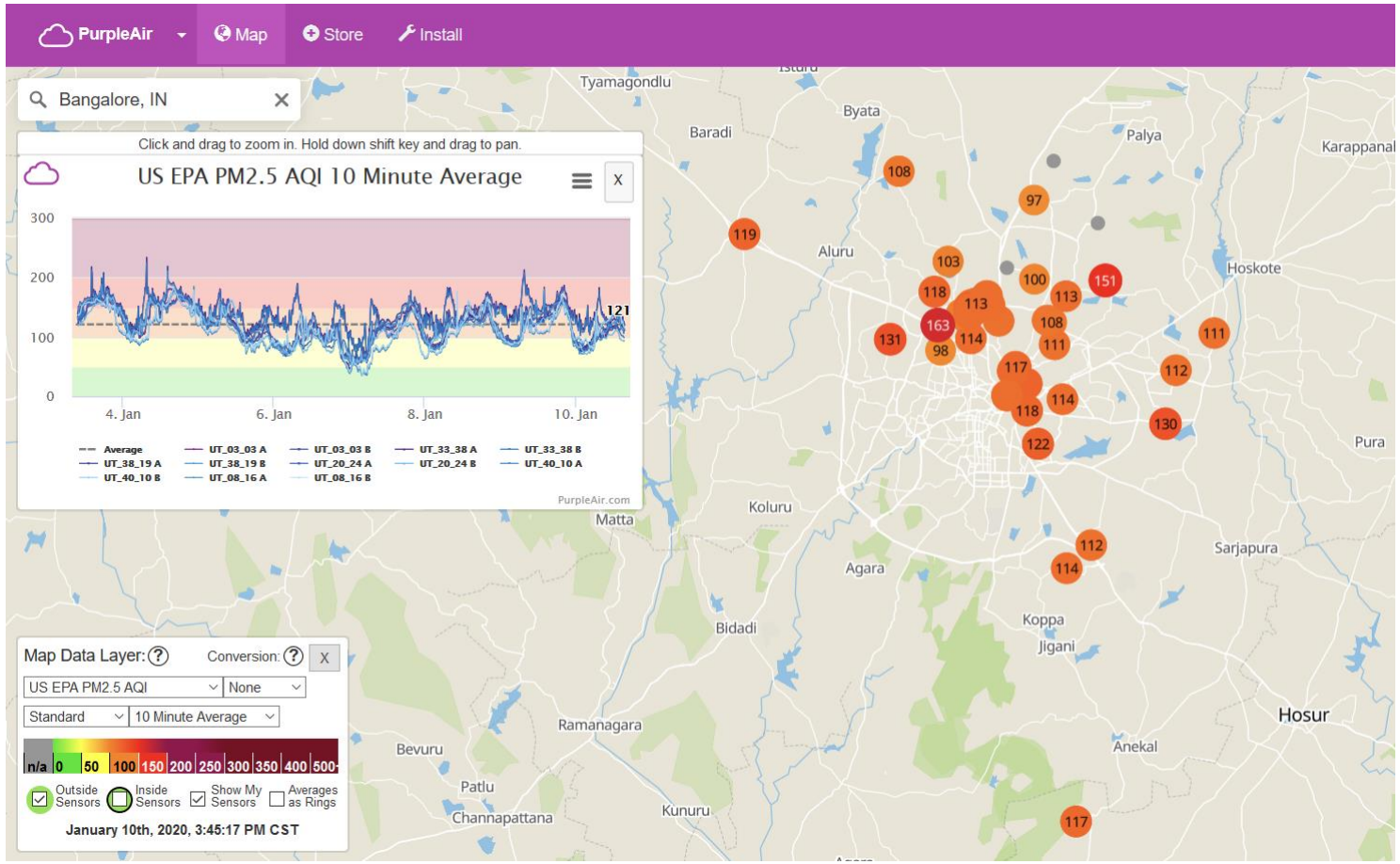
Our purpleair.com/map website.



Challenge of Establishing Community Partners

Our partners worked with different aspects of the air quality community.

ILK Consultancy

Center for Study of Science, Technology, and Policy

Sensing Local

Challenges of Finalizing Host Sites

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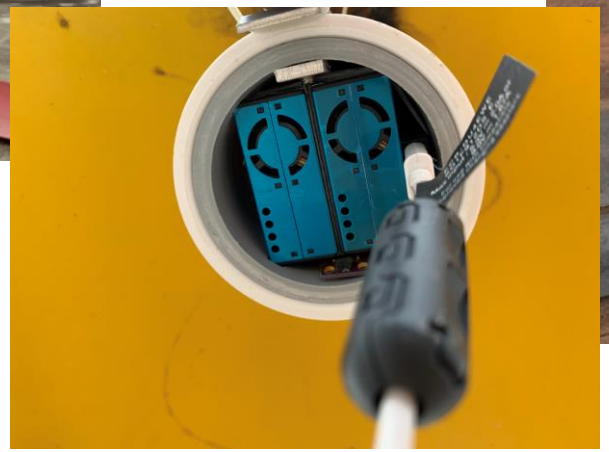
Building relationships with hosts to ensure their reliability and investment.



Challenges of Calibration

Co-location and calibration of 60 low-cost sensors with research grade equipment.

Challenges of Installing Low-cost Sensors

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A majority of the low-cost sensors remained online continuously.

Low-Cost Sensor Self-Correlation

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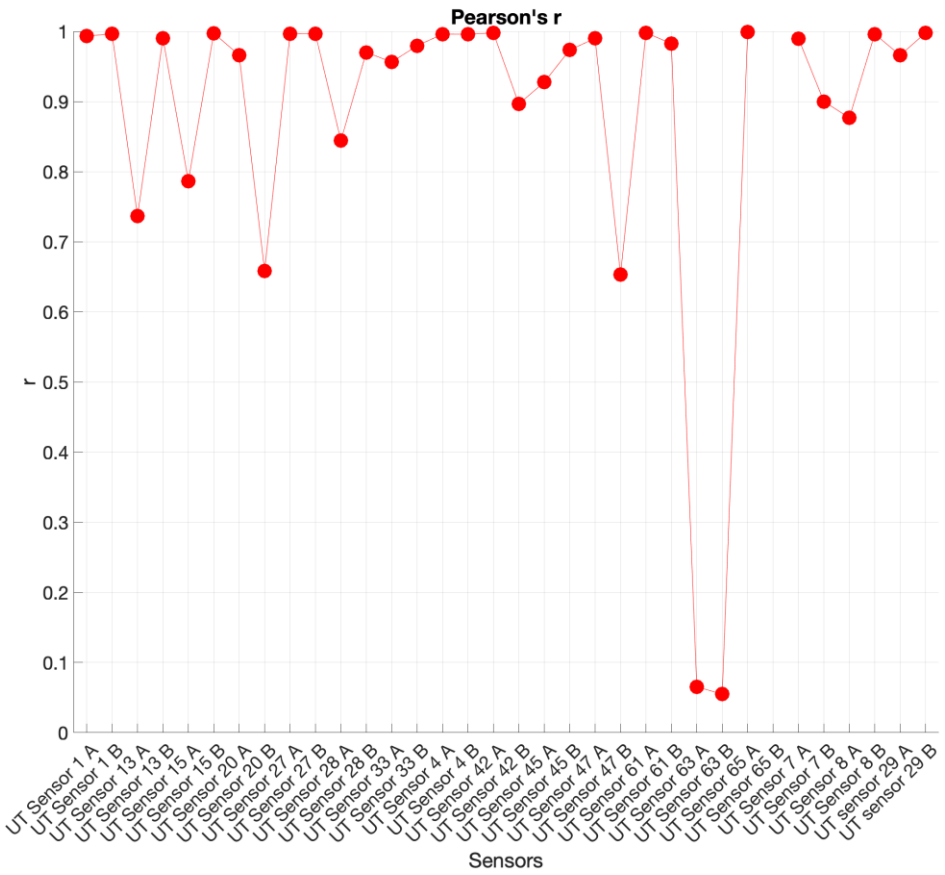
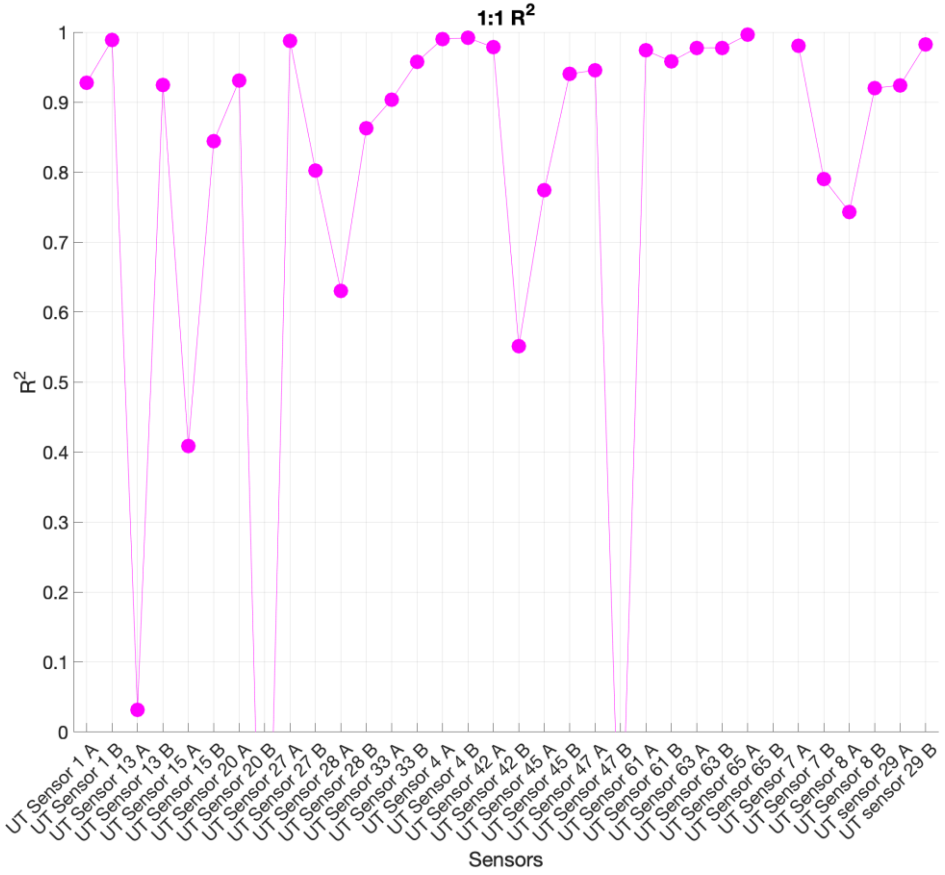
A strong correlation exists between the sensors.





Sensor Correlation with Research Equipment

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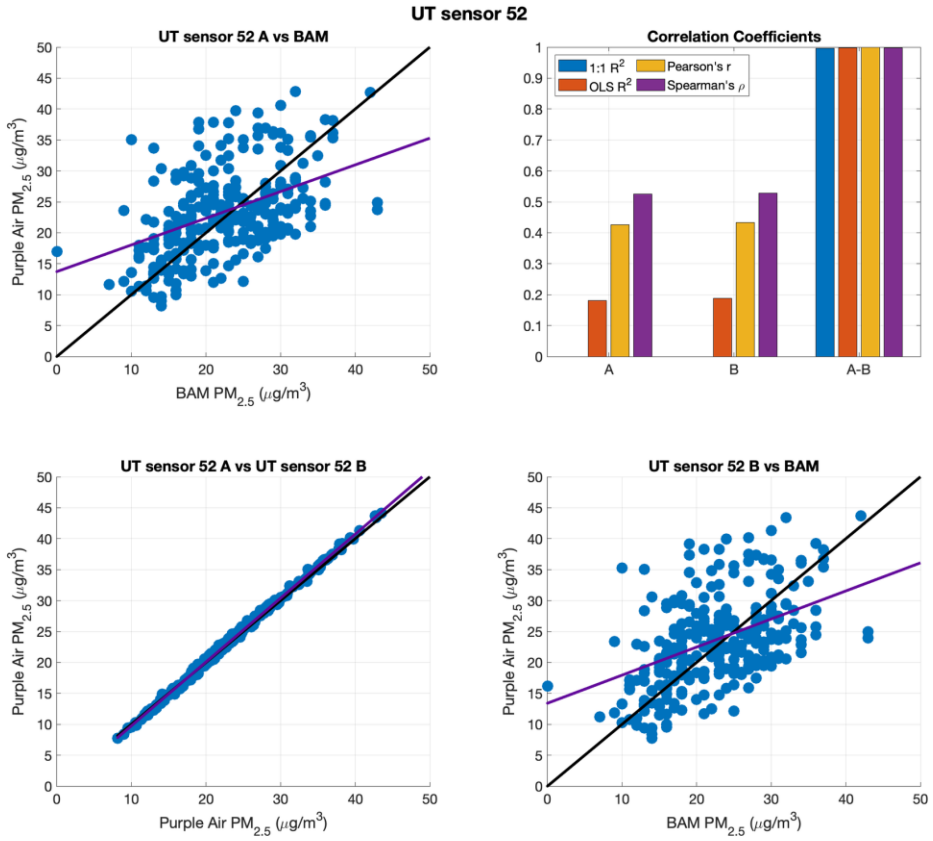
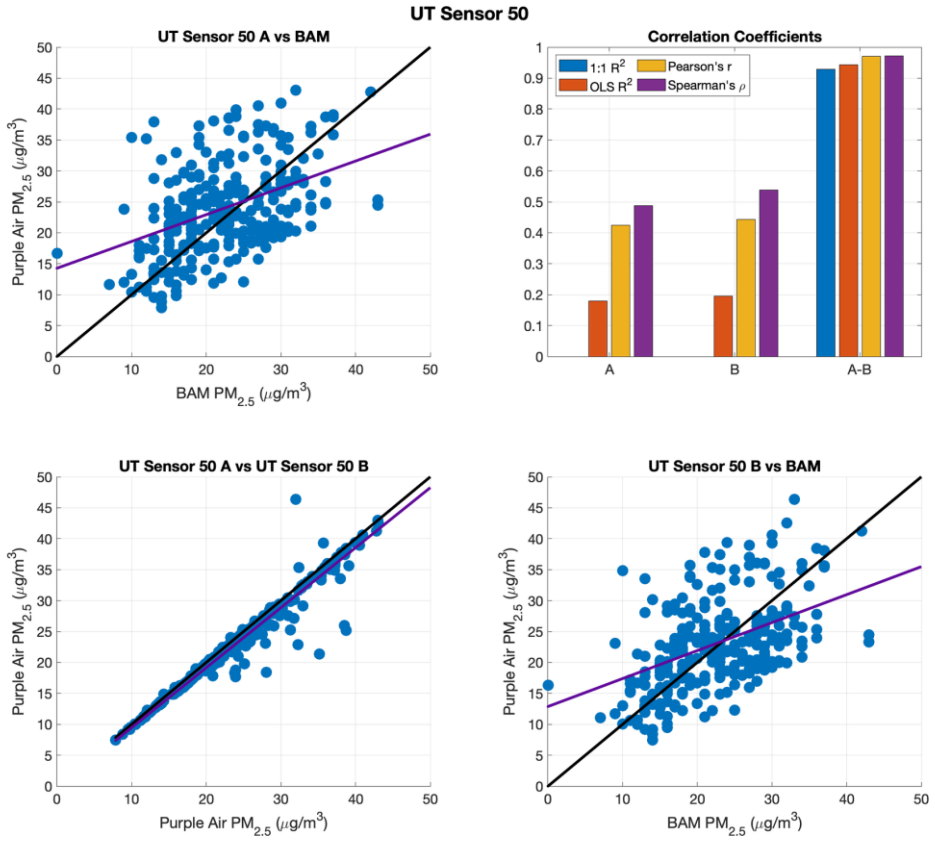
PurpleAir sensors are predictably inaccurate allowing us to correct for the inaccuracy and align to BAM measures.





Conclusion

Successfully shown utility of low-cost sensor networks and created toolkits for future projects.

Outcomes:

- Partnered with local communities.
- Successfully deployed low-cost sensors.
- Validated efficacy of the sensors in real-world conditions.
- Developed toolkits other can use to rollout sensors globally.
- Our sensors continue to provide insights into the air quality in Bangalore.