

# Exposing students to particulate matter sensors

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## Exposing Students

### Measuring particulate matter (pm)

- ◆ 80 high school students
- ◆ 20 tertiary education students (2nd year Bachelor)
- ◆ Internships, graduation projects (3rd and 4th year Bachelor)
- ◆ Increase affection for, and exposure to, science and technology

### Assignment - High School

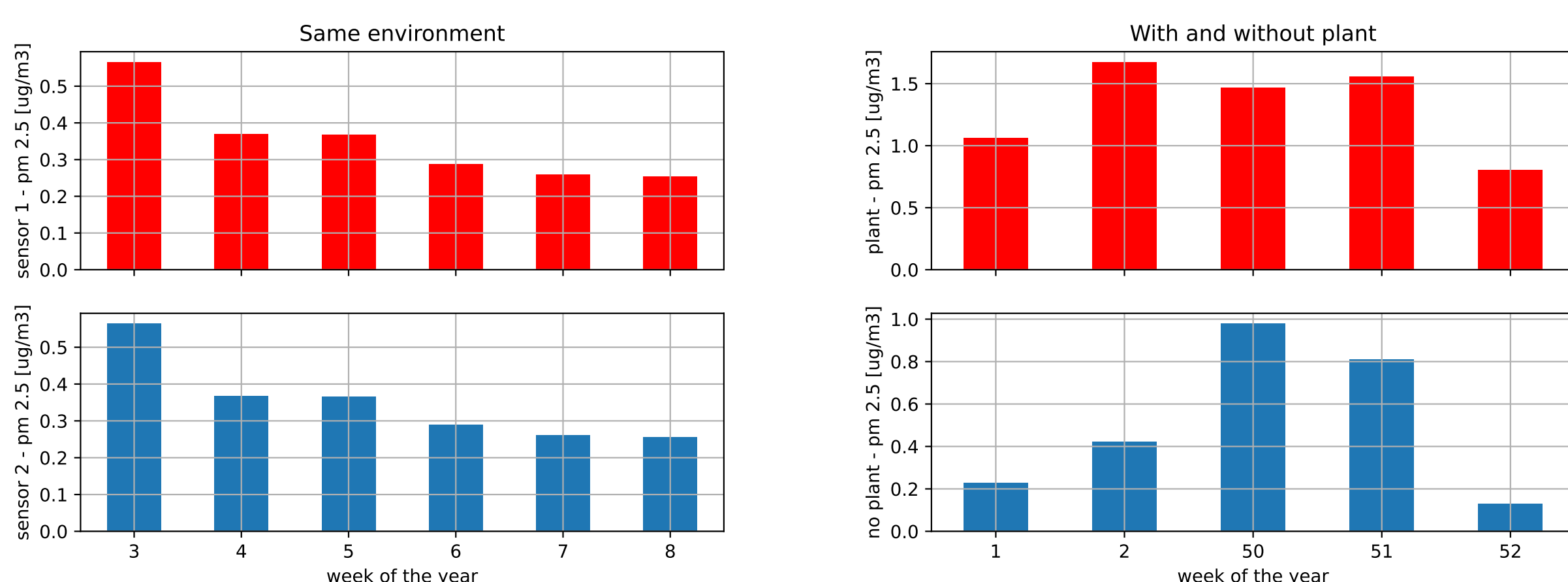
- Connect a Sensirion SPS30 to a Arduino
- Measure in your own environment
- Present the results

### Assignment - Tertiary Education

- Propose a research question
- Carry-out research and fieldwork
- Short-term projects, no indepth work
- Write a written report

### Internships & Graduation Projects

- Work together with a (research) institute
- Carry-out research and fieldwork
- Up to of 6 months of project-time
- Write a written report and present work



## What did they deliver?



### High School

- Many fieldmeasurements
- PM Exposure at roads, airports and at home
- PM<sub>10</sub> values between 0.1 µg m<sup>-3</sup> and 4000 µg m<sup>-3</sup>

### Tertiary Education

- 10 weeks of class (4 ECTS)
- Focus on reliable, reproducible measurements
- Learn critical thinking in research
- Long-term effects of sensors
- Example research questions:
  - Do plants decrease PM values in a room?
  - Can you measure increased PM values on a jacket from somebody who smokes?
  - What is the influence of humidity on the measurements?

## What did we and the students learn

### Technical

- It is hard to program a sensor
- Always validate your data
- Test your implementation
- Do not use the sensor when it is snowing
- 6 months is enough time for a project
- Plants generate PM

### Personal

- You are always exposed
- Use a logbook!
- You never measure what you intend to measure
- There is no such thing as enough data
- Planning for the weather is hard
- There are hidden gems in the data

### And our learning?

- Do not ask too many different things
- Expect the unexpected
- Give the students their own objective

Want to collaborate?  
We would like to work together!

