



A Living Lab Approach for more Sustainable Cities

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SUMMARY

Dr Francesco Pilla is working on several projects to tackle environmental issues in Dublin and in other European cities, with the aim of scaling up the technologies and approaches his group develops.

The research is currently co-designing and testing interventions with citizens to mitigate against poor air quality and its related health effects, to predict localised flooding and plan for future protection against such events, and to assess the value of green spaces to human health and wellbeing. The research is already increasing awareness among citizens of the need for greater sustainability, and the interventions are designed for larger-scale impact in Europe.

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Think Local, Act Scalable

Environmental damage is one of the biggest threats to humanity. If our environments are not safe and healthy, then humans cannot live safely and in good health.

Dr Francesco Pilla is working on numerous projects to develop technologies, strategies and awareness around environmental issues, engaging the public and piloting local studies and interventions in European cities that can then be scaled up to larger solutions.

“In my research, I tend to look at local issues and solutions, to design and validate them and then we can learn how to scale them up,” he explains.

Dr Pilla co-ordinates the EU-funded Horizon 2020 project iSCAPE (Improving the Smart Control of Air Pollution in Europe), which is piloting interventions in six cities, including Dublin, where the focus is on improving air quality for citizens by using urban furniture and plants to reroute or filter pollutants.

He is also an investigator with Smart Dublin on another EU-funded project called OPERANDUM which uses sensors and weather data to understand the risk of flooding from rivers, and he is working with colleagues at Trinity College Dublin to measure the effects of green spaces on health and wellbeing in cities.



In general, Dr Pilla's approach is one of engaging through a 'living lab' where citizens learn about and contribute to solutions. "If we don't engage with the people who are living in cities, if we don't get them to try the technology or share their experiences, then we run the risk that the solutions we develop stay on the shelf, will not be used," he says.

Tackling Tangible Issues

Dr Pilla's research addresses several aspects of living in a time of climate change and environmental threat. While the global issues are enormous, tailoring interventions to particular cities is proving a positive approach to engaging the people who live there.

In the iSCAPE project that Dr Pilla co-ordinates, several simple interventions are being trialled in Dublin to tackle the serious issue of poor quality air. "In Dublin because of the traffic, parts of the city are polluted with particulate matter, or PM. These tiny particles that we inhale are associated with all sorts of health issues, such as heart disease and cancer and problems with brain development, as well as the more obvious issues for people with lung conditions such as asthma," he explains.

Dr Pilla's group is **measuring the impact of installing simple urban 'furniture'** such as low-boundary walls that can funnel polluted air away from pedestrians and hedges, and trees that can not only provide a physical barrier but also a biological filter to clean the air. "We need to see what works and what doesn't, and to test various conditions such as changes in wind direction, and the types of vegetation," he says.

Green spaces are also a focus of the Connecting with Nature project, funded under the European Commission's Horizon 2020 programme, which uses nature-based solutions to improve wellbeing in cities. Within this project, Dr Pilla's group is developing a tool to assess the quality of green infrastructure such as parks in cities. Arising from the project, **their approach has already been used in London to plan vegetation** in the city.

Dublin, too, will benefit from technology developed by Dr Pilla's group: through the Smart Dublin initiative the UCD researchers are building a sensor-based system to **monitor weather and rivers and predict local flooding**.

Building Understanding

Understandably, Dr Pilla's work is attracting interest from industry collaborators, and he currently works with IBM on technology to underpin smart models and artificial intelligence to address environmental issues.

He is also ensuring that the research has a broad cultural and societal impact, **working with citizens in the Living Lab framework** and particularly with schoolchildren to increase their awareness of the need for sustainability. "We co-design interventions with people who live in the city and we engage

with the children, they are the citizens now who will live here the longest," says Dr Pilla. "Also, they go home from school after the workshops and they tell their parents about what we need to do!"



With **wide media coverage of his work**, including articles in The Irish Times and appearances on the BBC, Dr Pilla is bringing his research to a wider audience, and he also intends that when the approaches are validated locally, the **solutions and interventions will scale up for larger regions**, which will further magnify their impact. "We want to get it right at the small scale and have an impact there, then we have a better chance to have a larger impact across Europe."

Research References

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<https://smartdublin.ie/>

Connecting with Nature is a €12m five year project funded by the European Commission's Horizon 2020 Innovation Action Programme involving 29 project partners from industry, local authorities, local communities, NGO's and research in 16 countries. <https://connectingnature.eu/>

OPERANDUM (OPEN-air laborATORies for Nature baseD solUtions to Manage environmental risks) is a €12m project funded by the European Commission within the Innovation Actions programs plus an additional contribution of 2 million Euros from China and Australia. It involves 26 international partners for 4 years. <https://site.unibo.it/operandum/en>