**From fittings to artificial intelligence**

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Prof. Václav Holý was my supervisor when I landed in Prague in 2010 and that triggered one dramatic change in my computational life. After using Microsoft Excel to run the "calculations" of my Phd in Barcelona ("Growth and characterization of epitaxial magnetic layers…"), Prof. Holy introduced me to MATLAB and his personal library of hundreds of X-ray fitting scripts. I felt so empowered that during the second year of my post-doc I built the prototype of a magnetic traffic detection system based on scripts. First MATLAB, then OCTAVE, finally PYTHON – and BASH, only Linux.

I had a remarkable commercial success based on something that gradually gathered hundreds of IF/ THEN/ELSE, WHILE, FOR … loops. We peaked 20 employees and deployed sensors in Ecuador, Spain, Italy and Czech Republic – UK is coming if the Brexit allows. Not bad but … maintaining this type software was a nightmare. I needed a second software revolution.

I then started transforming the raw data columns into images and used pattern recognition to know which and how many cars were running on top of the sensors. The code was much more organized and scalability was now an easy thing. I was just discovering what is called "big-data", "Internet-of-Things", "machine learning", "artificial intelligence"… In my talk I will explain what I think is the relationship among them and their meanings – and their costs, and their opportunities. But now that everything looked good we had to navigate the cut of (excessive?) subsidies to the smartcity tech sector. How to further cut costs? I needed to do my third technological revolution.

If we could do "intelligent" stuff on software… why not doing it on "hardware"? How could I connect my solid state physics background to the internet and the artificial intelligence buzz?

I have been asking this question to myself for over two years. I will present my ideas on how to project current materials science and experimental solid state physics research to this new fashionable (and mandatory?) set of hashtags. I will present a prototype of our first 'pseudo-neuromorphic' analog device that can reduce my infrastructure costs to incredibly low values using portions of the artificial intelligence arena.