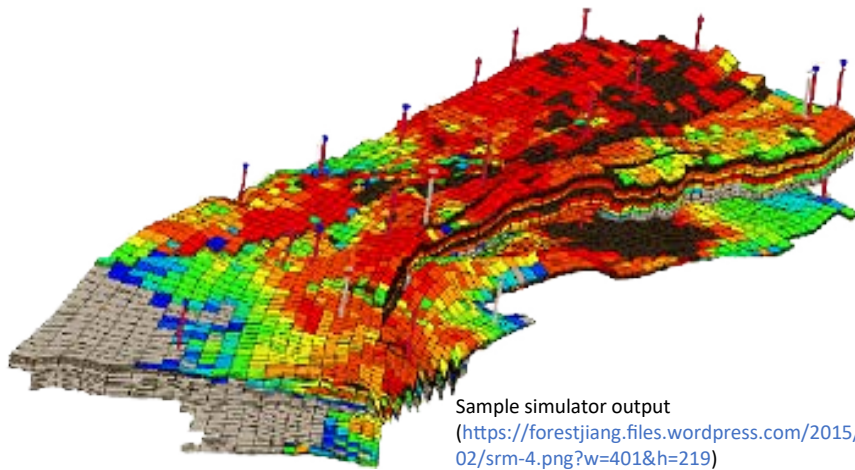


Testing a Simulator: Rokos Internship at Roxar Ltd.

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I spent 10 weeks of my summer at Roxar Ltd., at the Oxford Science Park. The company is part of the larger Emerson group and specializes in oil reservoir simulations. Their core product is such a simulator which takes geological measurements and data as input and predicts the evolution of an oil reservoir under the influence of natural processes and events as well as human activity. The codebase is large and requires many fine calculations and a great deal of parameters, and as such is accompanied by an extensive testing suite which I worked on.



In essence, the simulator takes a starting point in the distant past and models the evolution of the oil reservoir using flow equations based on a few dozen parameters (pressure, oil saturation, water, porosity etc.). The result is compared to modern-day measurements and used to optimize the placement of oil wells. As the simulator is regularly

being updated, each new version has to be compared to the previous one which is considered to give accurate results.

During my time there, I helped optimize the suite of testing scripts to check for memory leaks in the core code, optimize the pausing and resuming of large datasets, interfacing directly to the simulator to get accurate readings of parameters across all timesteps and grid points, better management of result files, clear comparison of errors in the simulation and a system to pinpoint broken code in the core simulator.

Working on this project has given me an insight into the complexity of physical simulators and the sheer effort required to make sure their results are consistent and correct. I have learned a new programming language (Python) from scratch and had my first long-term experience of working in a large team.