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Keynote - From Big Data with no Geology, to
Geology without Data, Quo Vadis?

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SUMMARY

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The author will present a personal perspective of past, current and future trends in petroleum Geostatistics, from the double angle of his experience as Geostatistics specialist in the early 80's, and of his various later assignments as reservoir and exploration engineer and manager.

Early petroleum applications of Geostatistics mostly related to specific tasks around filtering and interpolation of geophysical data for mapping.

Computer power increase in the 90's made possible the intensive use of process simulations of increasing complexity, allowing more efficient optimization or estimation tasks, but more importantly providing tools for reservoir geologists to populate 3D reservoir models with rock properties, creating for the first time a possible link between well description of heterogeneity and associated geological concepts for its spatial distribution. These applications were truly disruptive for the oil and gas business, making possible to produce more reliable reservoir forecasts and helping bridge the two worlds of geoscientists and engineers.

Twenty years later, Geostatistics techniques have become standard, with a wide spectrum of algorithms implemented in all commercial or internal geo-modeling software. Interestingly, Geostatistics started as statistical analysis of mining data of highly variable ore grades available in large quantity, where little, if any, serious geologic input or constraint – “big data mining with little geology concept” could we say. On the opposite, petroleum Geostatistics made significant steps forward with “small data sets and much expert knowledge”.

In an era of mega-computers and big data, where does the future of Geostatistics lie? As a pioneering “data science” is it embracing new statistical and data exploration approaches? How far has integration of large scale physical constraints gone? Do we better integrate geological knowledge? How is addressed uncertainty and risk associated with hardly calibrated “expert input”? How likely are alternative models with respect to available knowledge? Here are a few questions that will be addressed.