

Mining CFSG

"Cycle de Formation Spécialisée en Géostatistique"
Post-graduate training program



Learn best practices in mining geostatistics
and become operational after 5 weeks course

May 31, 2021 – July 2, 2021

Learn, practice and return to work with a solid understanding of the theory and application of geostatistics for resource estimation. Come with your data and leave with results.

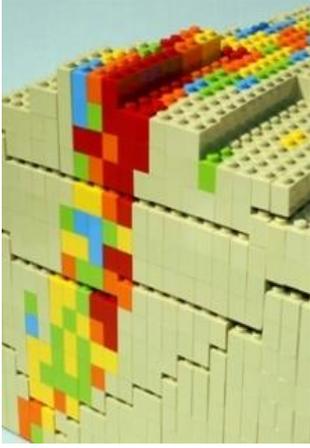
Develop your skills in a few weeks. Quickly get the technical level required to build the block models that your company needs for confident mine planning. Expand your know-how by exploring original techniques.

Benefit from the label *Ecole de Géostatistique de Fontainebleau*. It means that you get the support of top-level geostatisticians who gained their know-how from decades of experience working for major mining companies worldwide.



Mining Geostatistics – a particular branch of *spatial statistics* – aims at predicting valuable quantities from partial information like grades measured or facies observed at samples along drillholes. The main issue is the *block model*, which guides the mining process throughout the mine life.

Block modeling, at the heart of mining geostatistics practices

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|---|---|--|
| Sorting in units, facies or mineralogy classes |  | Predicting metallurgical recovery |
| Designing envelopes | | Predicting rock strength |
| Quantifying geological uncertainty | | Accounting for extreme values |
| Evaluating global and local resources above cutoffs | | Accounting for directionality of measurements in geotechnics |
| Predicting several grades (e.g. copper, gold) | | Optimizing open pit design |
| Analyzing sensitivity to sampling | | |
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Weekly program

Most training days are split into two parts:

- **Morning** - attendees are introduced to methods and supported theory.
- **Afternoon** - attendees put their new knowledge into practice with real case studies coming from the industry. Under the supervision of a senior geostatistician, they will use **Isatis.neo Mining Edition**, the software solution in geostatistics from our partner Geovariances.

Tuesday evenings and Fridays are dedicated to specific **Professional Projects** where participants work on their own dataset.

Course content – Main techniques covered

This 5-week program can be extended by 1 or 2 additional weeks if attendees' Professional Project requires it.

| | Week 1 Fundamentals I | Week 2 Fundamentals II | Week 3 Global and local resources I | Week 4 Global and local resources II | Week 5 Advanced methods |
|--------------------|---|--|---|--|--|
| Acquired practices | Block model for a monometallic deposit | Block model for a multi-element deposit, accounting for the geology | Block model using stochastic outcomes of geology and grades | Recoverable resource calculation for selective mining | <ul style="list-style-type: none"> – Extreme values – Open-pit optimization – Geological unit layout – Directionality and Geotechnics |
| Methods | <ul style="list-style-type: none"> – Univariate analyses – Variogram calculation and modelling – Stationary and non-stationary kriging | <ul style="list-style-type: none"> – Multivariate analyses – Cokriging – Indicator geostatistics – Transition analysis – Geology and grade estimation | <ul style="list-style-type: none"> – Gaussian anamorphosis – Multigaussian simulation by spectral and turning bands methods – Plurigaussian simulation | <ul style="list-style-type: none"> – Selectivity – Change of support – Information effect – Conditioning Expectation – Uniform Conditioning | <ul style="list-style-type: none"> – Top cut modeling – Disjunctive kriging – Multi-pit methods – Potential methods – 5D geostatistics for geotechnical variables |

CFSG

Since 1979, the *Cycle de Formation Spécialisée en Géostatistique* (CFSG) has been a reference training program for the mining industry professionals to learn how to apply this set of concepts, tools, methods and practices incepted by Georges Matheron and his team in the 60's - the prestigious *Ecole de Géostatistique de Fontainebleau* - a discipline which has spread all over the world.



Georges Matheron
1981, Fontainebleau

After 40 years and 400 attendees from around the world, the CFSG format changes to better meet today's needs of the mining industry. It is now reduced to 5 continuous weeks and attendees will develop a Professional Project all along this period. This project could typically be grade estimation for long or short-term mine planning block model.

WHO SHOULD ATTEND

To make this training beneficial, it is highly recommended to have knowledge in geology or mining engineering.

Course sessions, guidance and case study tutorials will be delivered in English. You will also be given a reference book either in English, French or Spanish.