

# GUILLAUME CAUMON

Université de Lorraine

ENSG-GeoRessources

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Born 12/28/1976 (46 years old)

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## CURRICULUM

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- 02/2011-  
today      **Professor (PR1) in Numerical Geology at Université de Lorraine, Teaching at *École Nationale Supérieure de Géologie* (ENSG) where I head the Numerical Geology Major**  
**Research at *GeoRessources* (UMR7359), where I am responsible of the Integrative Numerical Geology Team.**
- 2023-2028      **Senior Member of *Institut Universitaire de France (IUF)***
- 04/2015-  
07/2015      **Visiting Professor, Center for Wave Phenomena, Colorado School of Mines**
- 10/2009      **Habilitation diploma (HDR): *Towards integration of uncertainties and processes in numerical geology.***
- 01/2007-  
today      **Director of RING Consortium (formerly known as Gocad Research Consortium).** This joint industry program (budget ~400 KEUR/year) does methodological research in subsurface data integration, visualization and geomodeling.
- 09/2004-  
01/2011      ***Maître de Conférences* in Numerical Geology (Associate Professor) at INPL (now Université de Lorraine), *École Nationale Supérieure de Géologie* (ENSG) and Centre de Recherches Péetrographiques et Géochimiques (CRPG-CNRS-UPR 2300).**
- 08/2003-  
08/2004      **Postdoctoral Scholar, *Earth Resources Eng. Dept.*, Stanford, CA, USA, with Prof. Andre Journal: *Global uncertainty assessment using Bayesian spatial bootstrap.***
- 03/2003      **PhD in Geosciences from *Institut National Polytechnique de Lorraine* (INPL): *Representing, visualizing and modifying geoscientific solid models* (advisor: Prof. Jean-Laurent Mallet)**
- 09/1999-  
07/2003      **Research and teaching assistant at *Institut National Polytechnique de Lorraine* (INPL): development and unit tests of a G-Maps C++ library, gemodel updating and visualization. teaching geomodeling, algorithms, C++.**
- 1999      **MSc: (*Diplôme d'Études Approfondies*): *Rendering of discrete geological models in two and three dimensions.* and *Diplôme d'Ingénieur de l'École Nationale Supérieure de Géologie***

## EDUCATIONAL ACTIVITIES

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### Courses:

Before my nomination at IUF, I was teaching ~220 contact hours annually at Université de Lorraine / Nancy School of Geology (ENSG). The level (Undergrad – L) or Masters (M) and semester is indicated after the course title:

- Field mapping and Numerical Geology: 3D modeling of geological structures from field observations (L3-S6, 2008-2021).
- Petroleum Geoscience field trip: connecting field observation with exploration and reservoir modeling strategies (M1-S8, 2011-2019, 2023)
- Geostatistics: Stationarity and geology, spatial variability, estimation, simulation (M1-S7, since 2012).
- C++ programming (M2-S9, since 2004)
- Static reservoir modeling methodologies: from seismic interpretation to dynamic simulation. (M1-S8, 2008-2023)
- 3D modeling of ore deposits: definition of deep exploration targets and resource assessment (M2-S9, 2006-2016)
- Subsurface uncertainties (M2-S9, since 2004)
- Geomathematics: differential geometry, topology, meshes and geoscience applications (M2-S9, since 2007)
- Petroleum Field Case (in partnership with Total, M2-S9): integrated study of a petroleum field (2005-2023)
- Introduction to Data management in Geosciences (M1 S8; Telecom Nancy, 2016-2023)

### **Teaching responsibilities:**

- Responsible of the Numerical Geology specialty (S9) between 2006 and 2023: definition of the academic program in conjunction with industry needs, choice of instructors, personalized monitoring of students.
- Director of International Relations at ENSG (Nancy School of Geology) in 2011-2012: Management of the processes for studies abroad and welcoming foreign students.
- Elected Member of the ENSG council (2006-2010 and 2014-2020).
- Mentoring undergraduate and graduate students (SPE chapter faculty advisor, AAPG IBA tutor 2012-2016, projects, teaching assistants)

### **Student Supervision:**

#### **Supervision of over 48 MSc students since 2004.**

#### **Supervised 28 PhD students:**

1. Capucine Legentil (Local tetrahedral model updating: geometry and topology, 2019-2022), co-advised with Jeanne Pellerin and Paul Cupillard. Postdoc, TotalEnergies
2. Zoé Renat (Microseismic characterization by time reversal, 2019-2022), co-advised with Paul Cupillard. Geophysicist, GeoLink.
3. Paul Baville (Stratigraphic correlation uncertainty: impact of transport directions on computer-based multi-well correlations, Apr 2022), co-advised with Cédric Carpentier and Marcus Apel. Postdoc, AGW, KIT.
4. Melchior Schuh-Senlis (Using Stokes flow equations for the geomechanical restoration of geological structural models, Mar 2021), co-advised with Paul Cupillard. Geode Solutions
5. Nicolas Mastio (Improving the global coherency of the Shared Earth Model using static, dynamic and geomechanics data, Apr 2020), co-advised with Pierre Thore and Marianne Conin. Software developer, CapGemini.
6. Nicolas Clausolles (Stochastic seismic interpretation of salt bodies : detection, sampling and impact on seismic imaging, Mar 2020), co-advised with Pauline Collon. Geoscientist, BRGM.
7. Pierre Anquez (Repair and simplification of 3D structural models: impact on meshing and numerical simulations in seismology and hydrodynamics, Jun 2019), co-advised with Bruno Lévy and Jeanne Pellerin. CEO, Geode Solutions.
8. Modeste Irakarama (Structural uncertainty reduction by waveform inversion, Apr 2019), co-advised with Paul Cupillard and Paul Sava. Research Scientist, Exxonmobil Upstream Research.
9. Julien Renaudeau (Meshless structural modeling and restoration, Apr 2019), co-advised with Bruno Lévy and Frantz Maerten. Project Manager, Schlumberger.
10. Marion Parquer (Data and trend conditioning in pseudo-genetic simulation of sedimentary bodies, Apr 2018), co-advised with Pauline Collon. Postdoc, NRCAN (Natural Resources of Canada).
11. Gabriel Godefroy (Integration of kinematic concepts in structural modeling, Mar 2018), co-advised with Mary Ford. Research scientist, Total GRC, Aberdeen.

12. Jonathan Edwards (Stochastic well correlation in diverse sedimentological environments, Oct 2017), co-advised with Cedric Carpentier and Florent Lallier. Now with ESRI.
13. Benjamin Chauvin (Uncertainty management and reduction in 3D structural restoration, Jun 2017), co-advised with John Shaw. Postdoc with Harvard University.
14. Arnaud Botella (Conformable Hybrid gridding of geological objects by minimization, Apr 2016), co-advised with Bruno Lévy. President of Geode Solutions.
15. Gaetan Bardy (Usage of proxies for fast model ranking in reservoir studies, Oct 2015), co-advised with Philippe Renard and Peter King. Software Specialist with Haliburton.
16. Charline Julio (Stochastic structural modeling in the presence of dense data, Jun 2015), co-advised with Mary Ford. Software Geoscientist with PDS.
17. Jérémy Ruiu (object-based interpretation of sedimentary bodies in 2D and 3D raster data, Jun 2015), co-advised with Sophie Viseur. Software specialist with Modis.
18. Francois Bonneau (Indirect data and genetic principles during stochastic DFN simulation, Sep 2014), co-advised with Judith Sausse and Philippe Renard. Research Engineer, with ASGA.
19. Théophile Gentilhomme (Integration of seismic and production data in reservoir characterization, May 2014), co-advised with Dean Oliver and Jean-Jacques Royer. Researcher, CGG.
20. Jeanne Pellerin (Accounting for geological complexity of structural models in Voronoi-based gridding, Mar 2014), co-advised with Bruno Lévy. Postdoc WIAS, Berlin.
21. Romain Merland (Numerical Approaches in Unstructured Grid Generation for Flow Simulation in Geological Formations, Apr 2013), co-advised with Bruno Lévy. Geomodeling Software Specialist Paradigm, Paradigm
22. Gautier Laurent (Compatibility of geological structures in 3D modeling, Apr 2013), co-advised with Mark Jessell. Postdoc with Monash University.
23. Florent Lallier (Stochastic stratigraphic well correlation, Apr 2012). Co-advised with Sophie Viseur and Jean Borgomano. Research scientist, Total GRC.
24. Nicolas Cherpeau (Structural uncertainties in geomodeling: sampling and inverse approach, Apr 2012). Co-advised with Bruno Lévy. Geomodeling Software Specialist Paradigm.
25. Vincent Henrion (Pseudo-genetic methods for the simulation of the 3D geometry of fracture and karstic networks, Jul 2011), co-advised with Judith Sausse. Geoscientist, TotalEnergies.
26. Pauline Durand-Riard (Management of geological complexity in 3D geomechanical restoration, Nov 2010), co-advised with Mary Ford. Postdoc with Harvard.
27. Thomas Viard (GPU algorithms for uncertainty visualization, Oct 2010), co-advised with Bruno Lévy. Geomodeling researcher, Chevron.
28. Luc Buatois (Visualization and general purpose algorithms on GPU for unstructured meshes, May 2007), co-advised with Bruno Lévy and Jean-Claude Paul. Optimization specialist, Paradigm.

#### **Ongoing PhD students:**

1. Enrico Scarpa (Bridging the gap between static and flow models for complex channelized reservoirs, 2021-2024), co-advised with Pauline Collon.
2. Fabrice Taty Moukati (Stochastic seismic fault interpretation, 2021-2024), co-advised with Radu Stoica.
3. Marius Rapenne (Adaptive homogenization for seismic hazard assessment, 2021-2024), co-advised with Corentin Gouache and Paul Cupillard.
4. Julien Herrero (Transdimensional inversion of porous flow data, 2022-2025), co-advised with Thomas Bodin and Mustapha Zakari.
5. Paul Marchal (Structure-guided modeling of hydrothermal alteration – Application to unconformity Uranium deposits 2022-2026), co-advised with Pauline Collon and Julien Mercadier.
6. Amandine Fratani (Machine learning for the association of sparse structural data, 2022-2026), co-advised with Radu Stoica.
7. Giusi Ruggiero (Bayesian inversion of FWI data to reduce structural uncertainty, 2022-2026), co-advised by Paul Cupillard.

#### **External PhD Committee member:**

1. John Manchuck (Univ. Alberta, 2010),
2. Jonathan Gallon (Univ. Pau, 2011),
3. Alessandro Comunian (Univ. Neuchâtel, 2011),
4. Cédric Guyonnet-Benaize (Univ. Provence, 2011),
5. Danitza Aburto (Mines Paris Tech, 2012),

6. Mark Lindsay (Univ. Toulouse and Monash Univ., 2012),
7. Andrea Borghi (Univ. Neuchâtel, 2013),
8. Caroline Planteblat (Univ. Lausanne and Univ. Grenoble, 2013),
9. Maria José Ramón (Univ. Zaragoza, 2013),
10. Chakib Bennis (Habilitation, UPMC, 2013)
11. Fanny Bastide (Univ. Lausanne and Univ. Grenoble, 2014)
12. Caroline Gardet (Univ. Pierre et Marie Curie, Paris, 2014),
13. Pierrick Altwegg (Univ. Neuchâtel, 2015).
14. Matthieu Delorme (Univ. de Toulouse, 2015)
15. Caroline Dubois (Univ. Mons, 2015)
16. Alexander Darishchev (Univ. Rennes 1, 2015)
17. Victor Zaytsev (Mines ParisTech, 2016)
18. Jihane Belhadj (Mines ParisTech, 2016)
19. Cyprien Lanteaume (Univ. Aix-Marseille, 2017)
20. Hannah Wehr (Univ. Toulouse, 2017)
21. Keurfon Luu (PSL – MinesParisTech, 2018)
22. Christoph Jäggli (Univ. Neuchâtel, Dec 2018)
23. Hamid Badri (Univ. Strasbourg, Dec 2018)
24. Joseph Baudrillard (Univ; Grenoble-Alpes, Dec 2018)
25. Valentin Gauthier (Univ. Poitiers, Jan 2019)
26. Théa Ragon (Univ. de côte d'Azur, May 2019)
27. Laure Pizzella (PSL-Mines Paris Tech, December 2020)
28. Lauriane Bouard (Université de Nice, March 2021)
29. Alan Troncoso (MSL-Mines ParisTech, Sept 2022)
30. Mustapha Mouleifard (RWTH Aachen, Dec 2022)
31. Quentin Corlay (Heriot Watt University, Feb 2023)

## RESEARCH ACTIVITIES

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### Research themes:

My research interests concern the development of methodologies to integrate geological and physical observations in a common theoretical and numerical framework. To that respect, I work on defining appropriate geological parameterizations useful to solve possibly joint inverse problems. This requires in particular to look for answers to the following questions:

- What is a proper mathematical or numerical formalism to translate qualitative geological concepts into rigorous modeling algorithms and rules while honoring quantitative observations?
- How to sample and visualize geological uncertainty in 3D models? What role do geological concepts play in modeling subsurface uncertainty?
- How to adapt and possibly simplify 3D descriptive geological models to extract the main relevant parameters to solve a given physical problem?
- How to implement these methods into useful technologies to serve scientific discovery or societal needs? In this frame, I have been involved in partnerships with the industry mainly on subsurface reservoirs, mining and risk management.

### Distinctions:

**2023-2028:** Senior member (innovation chair) of **Institut Universitaire de France**.

**2020:** **Chevalier des Palmes Académiques** from the French Ministry of Education.

**2019:** **Michel Guilloud Schlumberger Award** from the French Academy of Sciences.

**2018: Best student presentation Award** from the International Association of Mathematical Geosciences to PhD student Nicolas Clausolles for his presentation at the annual International Association for Mathematical Geosciences (IAMG) conference (Clausolles, Collon & Caumon).

**2016: SPE Regional Distinguished Achievement Award for Petroleum Engineering Faculty** (South, Central and East Europe Region).

**2015: Computers & Geosciences Best Paper Award** (Laurent, Caumon & Jessell).

**2014: Computers & Geosciences Best Paper Award** (Pellerin, Lévy & Caumon).

**2014: IAMG / Award** to former PhD student Jeanne Pellerin, on her PhD and postdoctoral research.

**2011: Merit Award** from Society of Exploration Geophysicists (SEG) to PhD student Nicolas Cherpeau for his presentation at SEG annual conference.

**2011: MSc Presentation Award** from Society of Petroleum Engineers (SPE) at the European Contest to MSc student Antoine Bouziat.

**2009: Vistelius Award** of the International Association of Mathematical Geosciences (IAMG).

**2009: Significant Achievement Award** from Society of Exploration Geophysicists (SEG), to the Gocad Research Consortium.

**2007: Texas Instrument Student paper award** to PhD student Luc Buatois, for his presentation at the High Performance Computing Conference.

## **Professional services, committees and memberships:**

- 2023: Scientific Committee, IAMG 2023 (Trondheim)
- 09/2022: Conference chair of *IAMG 2022* (Nancy), the Annual Meeting of the International Association of Mathematical Geosciences.
- 08/2022-to-date: Member of the Scientific Committee of the GEOMOD Program (BRGM).
- 2022: Member of the strategic committee of the Nancy School of Geology.
- 02/2021: Organization committee of the 2<sup>nd</sup> AAPG Middle East Workshop on decision-based Integrated Reservoir Modeling.
- 04/2020-to-date: Expert of the Scientific Council of IFPEN.
- 2012-to-date: Responsible of the Integrative numerical geology team of GeoRessources and member of the directory committee.
- 06/2019: Member of the assessment board of the Geosciences Dept. of IFPEN.
- 05/2018: Member of the assessment panel of the Niels Bohr Institute, Copenhagen.
- 2017-to-date: Member of the experts committee of the Pole Avenia (French subsurface competitiveness cluster).
- 2016, 2017: Special section guest editor for the SEG/AAPG journal *Interpretation*.
- 2012-2014: Deputy Editor of *Mathematical Geosciences*
- 2008-to-date: Editorial board member of *Mathematical Geosciences*
- 2014: Guest Editor for a Special Issue of *Mathematical Geosciences* on 3D structural Modeling
- 2012-2014: Member of the Scientific Advisory Board of the Advanced Mining Technology Center at Universidad de Chile, Santiago ([www.amtc.cl](http://www.amtc.cl)).
- Convener / Committee member at international congresses (EAGE Integrated reservoir Modeling Conference 2014, IAMG 2011, IAMG 2009, ECMOR 2008, IGC 2008, IAMG 2006).
- 2010-to-date: Faculty advisor of the SPE student chapter of Université de Lorraine
- 2010-to-date: Co-advisor of the ENSG team participating to the AAPG's *Imperial Barrel Award*.
- 2014: Served in the Jury of the SPE *Student Paper Contest* de la SPE at the Annual Technical Conference and Exhibition in Amsterdam.
- Reviewer for *Computers & Geosciences*, *Mathematical Geosciences*, *Solid Earth*, *GMD*, *CR Geosciences*, *Ore Geology Reviews*, *Basin Research*, *Geostatistics Congress*, *Computers and Graphics*.

- Member of:
  - Society of Petroleum Engineers (SPE)
  - American Association of Petroleum Geologists (AAPG)
  - European Association of Geoscientists and Engineers (EAGE)
  - Society of Exploration Geophysicists (SEG)
  - International Association of Mathematical Geology (IAMG)
  - *Société Géologique de France* (SGF).

## PUBLICATIONS<sup>1</sup>

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### 5 Most significant publications

1. **Caumon, G.** (2018) Geological Objects and Physical Parameter Fields in the Subsurface: A Review. In: Daya Sagar BS, Cheng Q, Agterberg F (eds) Handbook of Mathematical Geosciences. Springer International Publishing, pp 567–588
2. **Caumon, G.**, Lepage, F., Sword, C. H., and Mallet, J.-L. (2004). Building and editing Sealed Geological Models. *Mathematical Geology*, Vol. 36 (4), p. 405-424.
3. **Caumon, G.** (2010). Towards stochastic time-varying geological modeling. *Mathematical Geosciences*, 42 (5):555-569.
4. *Cherpeau, N.*, **Caumon, G.**, Caers, J. and Lévy. B. (2012). Method for stochastic inverse modeling of fault geometry and connectivity using flow data. *Mathematical Geosciences*, 44(2):147-168.
5. *Laurent, G.*, **Caumon, G.**, Jessell, M. (2015). Interactive editing of 3D geological structures and tectonic history sketching via a rigid element method. *Computers & Geosciences* 74:56-67

### Bibliometrics

Orcid: 0000-0002-7828-4600

ResearcherID: C-5454-2012

71 journal publications, 5 book chapters, 58 peer-reviewed conference papers.

Bibliometrics	Citations	Citations (w/o self-citations)	H index
<b>WoS (06/2023)</b>	1700	1384	23
<b>Scopus (06/2023)</b>	2236	N/A	26
<b>Google Scholar (06/2023)</b>	3732	N/A	31

### Peer-reviewed journal articles

1. Legentil, C., Pellerin, J., Ragueneil, M., & Caumon, G. (2023). Towards a workflow to evaluate geological layering uncertainty on CO<sub>2</sub> injection simulation. *Applied Computing and Geosciences*, 100118. <https://doi.org/10.1016/j.acags.2023.100118>
2. *Clausolles, N.*, Collon, P., Irakarama, M., Caumon, G. (2023). Stochastic velocity modeling for assessment of imaging uncertainty during seismic migration: application to salt bodies. *Interpretation* 1–67. DOI:10.1190/int-2022-0071.1
3. *Anquez, P.*, Glinsky, N., Cupillard, P., **Caumon, G.** (2022). Impacts of geometric model simplifications on wave propagation—application to ground motion simulation in the lower Var valley basin (France). *Geophysical Journal International* 229:110–137. DOI:10.1093/gji/ggab447
4. Balarac, G., Basile, F., Bénard, P., Bordeu, F., Chapelier, J.-B., Cirrottola, L., **Caumon, G.**, Dapogny, C., Frey, P., Froehly, A., Ghigliotti, G., Laraufie, R., Lartigue, G., *Legentil, C.*, Mercier, R., Moureau, V., Nardoni, C., Pertant, S., Zakari, M. (2022). Tetrahedral remeshing in the context of large-scale numerical simulation and high performance computing. *Mathematics In Action*. 11:129-164. DOI:10.5802/msia.22
5. *Baville, P.*, Apel, M., Hoth, S., Knaust, D., Antoine, C., Carpentier, C., **Caumon, G.** (2022). Computer-assisted stochastic multi-well correlation: Sedimentary facies versus well distality. *Marine and Petroleum Geology* 135:105371. DOI:10.1016/j.marpetgeo.2021.105371
6. Irakarama, M., Thierry-Coudon, M., Zakari, M., **Caumon, G.** (2022). Finite element implicit 3D subsurface structural modeling. *Computer-Aided Design*. 149:103267. DOI:10.1016/j.cad.2022.103267.

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<sup>1</sup> Authors in italic are advised PhD or MSc students

7. *Legentil, C., Pellerin, J., Cupillard, P., Froehly, A., Caumon, G.* (2022). Testing scenarios on geological models: Local interface insertion in a 2D mesh and its impact on seismic wave simulation. *Computers & Geosciences* 159:105013. DOI:10.1016/j.cageo.2021.105013
8. *Godefroy, G., Caumon, G., Laurent, G., Bonneau, F.* (2021). Multi-scenario interpretations from sparse fault evidence using graph theory and geological rules. *Journal of Geophysical Research: Solid Earth*. 126(2):e2020JB020022. DOI:10.1029/2020JB020022
9. *Grose, L., Ailleres, L., Laurent, G., Caumon, G., Jessell, M., Armit, R.* (2021). Modelling of faults in LoopStructural 1.0. *Geosci. Model Dev.* 14, 6197–6213. DOI:10.5194/gmd-14-6197-2021
10. *Irakarama, M., Laurent, G., Renaudeau, J., Caumon, G.* (2021). Finite Difference Implicit Structural Modeling of Geological Structures. *Mathematical Geosciences*. DOI:10.1007/s11004-020-09887-w
11. *Martinelli, M., Bistacchi, A., Mittempergher, S., Bonneau, F., Balsamo, F., Caumon, G., Meda, M.* (2020). Damage zone characterization combining scan-line and scan-area analysis on a km-scale Digital Outcrop Model: The Qala Fault (Gozo). *Journal of Structural Geology*, 140, 104144. DOI:10.1016/j.jsg.2020.104144
12. *Mastio N., Thore, P., Conin, M., Caumon, G.* (2020). Determination of a stress-dependent rock-physics model using anisotropic time-lapse tomographic inversion. *Geophysics*, 85(4), C141–C152. DOI:10.1190/geo2019-0526.1
13. *Mourlanette, P., Biver, P., Renard, P., Nøtinger, B., Caumon, G., Perrier, Y. A.* (2020). Direct simulation of non-additive properties on unstructured grids. *Advances in Water Resources*, 143, 103665. DOI:10.1016/j.advwatres.2020.103665
14. *Parquer, M., Yan, N., Colombero, L., Mountney, N.P., Collon, P., Caumon, G.* (2020). Combined inverse and forward numerical modelling for reconstruction of channel evolution and facies distributions in fluvial meander-belt deposits. *Marine and Petroleum Geology* 117, 104409. DOI:10.1016/j.marpetgeo.2020.104409
15. *Schuh-Senlis, M., Thieulot, C., Cupillard, P., Caumon, G.* (2020). Towards the application of Stokes flow equations to structural restoration simulations. *Solid Earth*, 11, 1909–1930. DOI:10.5194/se-2020-89
16. *Wu, X., Geng, Z., Shi, Y., Pham, N., Fomel, S., Caumon, G.*, 2020. Building realistic structure models to train convolutional neural networks for seismic structural interpretation. *Geophysics* 85, WA27–WA39. DOI:10.1190/geo2019-0375.1
17. *Anquez P., Pellerin J., Irakarama M., Cupillard P., Lévy B., Caumon G.* (2019). Automatic correction and simplification of geological maps and cross-sections for numerical simulations. *Comptes-Rendus Geosciences*. 351:48-58. DOI:10.1016/j.crte.2018.12.001
18. *Bardy, G., Biver, P., Caumon, G., Renard, P.* (2019). Oil production uncertainty assessment by predicting reservoir production curves and confidence intervals from arbitrary proxy responses. *Journal of Petroleum science and Engineering* 176:116. DOI: 10.1016/j.petrol.2019.01.035
19. *Clausolles, N., Collon, P., & Caumon, G.* (2019). Generating variable shapes of salt geobodies from seismic images and prior geological knowledge. *Interpretation* 7(4):T829-T841. DOI:10.1190/int-2019-0032.1
20. *Godefroy, G., Caumon, G., Laurent, G., Bonneau, F.* (2019). Structural interpretation of sparse fault data using graph theory and geological rules. *Mathematical Geosciences* 51(8):. DOI:10.1007/s11004-019-09800-0
21. *Irakarama M., Cupillard P., Caumon G., Sava P. & Edwards J.* (2019). Appraising structural interpretations using seismic data - theoretical elements. *Geophysics*. DOI: 10.1190/geo2018-0128.1
22. *Parquer, M., Caumon, G., Collon, P.* (2019). A stochastic reconstitution method for determining the abandoned channel meander chronology. *Geomorphology*. DOI:10.1016/j.geomorph.2019.07.011
23. *Renaudeau, J., Malvezin, E., Maerten, F., Caumon, G.* (2019). Implicit structural modeling by minimization of the bending energy with moving least squares functions. *Mathematical Geosciences*. 51(6):693-724. DOI:10.1007/s11004-019-09789-6
24. *Chauvin, B. P., Stockmeyer, J. M., Lovely, P. J., Plesch, A., Caumon, G., Shaw, J. H.* (2018). Consistent boundary conditions in 3D mechanics-based restoration: validation on an extensional sandbox model. *AAPG Bulletin* 102(2):245-266. DOI:10.1306/0504171620817154
25. *Edwards, J., Lallier, F., Caumon, G., Carpentier, C.* (2018). Uncertainty management in stratigraphic well correlation: A training based method. *Computers & Geosciences*. 111:1-17. DOI: 10.1016/j.cageo.2017.10.008
26. *Godefroy, G., Caumon, G., Ford, M.* (2018). A parametric fault displacement model to introduce kinematic control into modeling faults from sparse data. *Interpretation*. 6(2), B1-B13. DOI: 10.1190/int-2017-0059.1
27. *Wellmann, F. & Caumon, G.* (2018). 3-D Structural Geological Models: Concepts, Methods, and Uncertainties. *Advances in Geophysics*. 59: 1-121. DOI:10.1016/bs.agph.2018.09.001
28. *Grose L., Laurent G., Aillères L., Armit, R., Jessell, M., Caumon, G.* (2017). Structural data constraints for implicit modeling of folds. *Journal of Structural Geology* 104:80–92.
29. *Parquer, M. N., Collon, P., Caumon, G.* (2017). Reconstruction of channelized systems through a conditioned reverse migration method. *Mathematical Geosciences* 49(8):965-994.
30. *Pellerin, J., Botella, A., Mazuyer, A., Chauvin, B., Bonneau, F., Levy, B., Caumon, G.* (2017). RINGMesh: A programming library for developing mesh based geomodeling applications. *Computers & Geosciences*. 104:93-100.
31. *Wu, X., Caumon, G.,* (2017). Simultaneous multiple well-seismic ties using flattened synthetic and real seismograms. *Geophysics* 82(1):IM13-IM20. doi:10.1190/geo2016-0295.1
32. *Bonneau, F., Caumon, G., Renard, P.* (2016). Impact of a Stochastic Sequential Implantation of Fractures on the Spatial Correlations and Connectivity of Discrete Fracture Networks. *Journal of Geophysical Research – Solid Earth*. 121(8): 5641–5658 DOI:10.1002/2015JB012451

33. Botella, A., Levy, B., Caumon, G. (2016). Indirect unstructured hex-dominant mesh generation using tetrahedra recombination. *Computational Geosciences* 20(3):437-451. DOI:10.1007/s10596-015-9484-9
34. Collon, P., Pichat, A., Kergaravat, C., Botella, A., Caumon, G., Ringenbach, J.-C., Callot, J.-P. (2016). 3D modeling from outcrop data in a salt tectonic context: Example from the Inceyol minibasin, Sivas Basin, Turkey. *Interpretation* 4:SM17-SM31. doi:10.1190/INT-2015-0178.1
35. Lallier, F., Caumon, G., Borgomano J., Viseur, S., Royer, J.-J. (2016). Uncertainty assessment in stratigraphic well correlation of a carbonate ramp: method and application to the Beausset Basin, SE France. *CR Géosciences* 348(7):499-509. DOI:10.1016/j.crte.2015.10.002
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## Book chapters, other papers:

1. *Caumon, G. (2018) Geological Objects and Physical Parameter Fields in the Subsurface: A Review. In: Daya Sagar BS, Cheng Q, Agterberg F (eds) Handbook of Mathematical Geosciences. Springer International Publishing, pp 567–588*
2. *De Lumley, H., Fontaneil, C., Grégoire, S., Batalla, G., Caumon, G., Celiberti, V. et al. (2015) Caune de l'Arago Tautavel-en-Roussillon, Pyrénées-Orientales, France. Tome VI: Individualisation des unités archéostratigraphiques. CNRS Editions, 641 p.*
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## Editorials:

1. *Caumon, G., Jessell, M., de Kemp, E., Nemeth, B., Peron, G., Schetselaar, E. (2016). Introduction to special section: Building complex and realistic geological models from sparse data. Interpretation 4:SMI-SMi. doi:10.1190/INT-2016-0614-SPSEINTRO.1*
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## Invited and keynote presentations:

1. *Caumon, G., Collon, P. (2022). Modélisations structurales implicites ou explicites et leurs rôles pour la modélisation rapide de formations géologiques. Invited presentation, Transitions numériques en géologie de l'ingénieur, CFGI, Paris.*
2. *Caumon, G et al. (2022). Association de données éparses (failles et/ou stratigraphie) : nouvelles approches de corrélation et de modélisation des incertitudes. Invited presentation, Transitions numériques en géologie de l'ingénieur, CFGI, Paris.*

3. **Caumon, G.** (2021). Behind the outcrop: On 3D subsurface modeling and uncertainty management. Keynote presentation, *VCG 2021*, Marseille, France and online.
4. **Caumon G.** (2021) A (biased) historical review and status of 3D geological modeling. Invited presentation, IMAGE workshop 09 : 3D Computer Geologic Modeling for Geophysicists and How to Integrate Geologic and Geophysical Computer Earth Modeling.
5. **Caumon, G.** (2018). Geological objects and physical parameter fields in the subsurface: a review. Keynote presentation, *IAMG Annual Conference*, Olomouc, Czech Republic.
6. **Caumon, G., Godefroy, G., Edwards, J.** (2018). On the Need for Spatial adaptivity and geological constraints in integrative subsurface models. Keynote presentation, EAGE Workshop 02 (Data Integration in Geoscience - Perspectives for Computational Methods), Copenhagen, Denmark.
7. **Caumon, G.** (2015). Accurate geological modeling for subsurface applications and the need for uncertainty assessment. Invited presentation, *GeoBerlin, DGGV - DMG*, Berlin.
8. **Caumon, G.** (2012). Recherches en géomodélisation et gisements miniers : avancées et perspectives. Invited presentation, *École Thématique Ressources Minérales : la vision du mineur*. CNRS-INSU, Mines Paris Tech, Paris.
9. **Caumon, G.** (2010). Geological structures and inverse problems. Workshop in hommage to Albert Tarantola, IPGP, Paris, France.
10. **Caumon, G.** (2009). Towards 5D Geological Modeling, IAMG 2009, Vistelius Award Presentation. Stanford, CA, USA.
11. **Caumon G.** (2008). Achievements and future challenges in geomodelling. Gocad Mining Users meeting, Mira Geosciences, Vancouver, Canada.
12. **Caumon G., Royer J.-J.** (2008). Nouvelles technologies 3D et potentialités du géomodeleur Gocad appliquées à l'estimation de ressources minérales. Invited Presentation, 3ème Colloque De Launay, Nancy, France.
13. **Caumon, G.** (2007). Towards a Better Description of Subsurface Heterogeneities. Invited presentation, 4th SPICE Research and Training Workshop, Cargèse, France.
14. **Caumon, G.** (2006). Handling Structural Uncertainty: What can Bayes do for us? Statoil Research Summit, Trondheim; Norway.

## Extended abstracts, Conference proceedings:

1. Giraud, J., **Caumon, G.**, Grose, L., Cupillard, P. (2022) Geometrical Inversion Coupled with Automated Geological Modelling. *83rd EAGE Annual Conference & Exhibition*. p. 1-5. European Association of Geoscientists & Engineers, Madrid, Spain / Online, Spain. DOI:10.3997/2214-4609.202210522
2. Irakarama, M., Thierry-Coudon, M., Zakari, M., Anquez, P., **Caumon, G.** (2021) Implicit 3D Subsurface Structural Modeling by Finite Elements. In: 82nd EAGE Annual Conference & Exhibition. p. 1-5. European Association of Geoscientists & Engineers, Amsterdam, The Netherlands. DOI:10.3997/2214-4609.202113091
3. *Anquez, P., Zakari, M., Caumon, G.* (2020), Comparing three DFN simplification strategies for two-phase flow applications, *ECMOR XVII*, 2020:1-21. DOI:10.3997/2214-4609.202035112
4. *Renaudeau, J., Irakarama, M., Laurent, G., Maerten, F., Caumon, G.* (2019). Implicit modelling of geological structures: a Cartesian grid method handling discontinuities with ghost points. In: *Boundary Elements and other Mesh Reduction Methods XXXI* (Vol. 122, pp. 189–199). New Forest, UK: WIT Press, Southampton, UK. DOI:10.2495/BE410171
5. *Anquez, P., Pellerin, J., Caumon, G.* (2018). A Graph-Based Method to Detect and Correct Invalid Features in Subsurface Structural Models. In *80th EAGE Conference and Exhibition 2018*. DOI:10.3997/2214-4609.201801233
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7. *Clausolles, N., Collon, P., Caumon, G.* (2018). A Workflow for 3D Stochastic Modeling of Salt from Seismic Images. In *80th EAGE Conference and Exhibition 2018*. Copenhagen: EAGE. DOI:10.3997/2214-4609.201801272
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