

## Curriculum vitae and track record

### PERSONAL INFORMATION

- Family name, First name: Cayeux, Eric
- Date of birth: 30.04.1962
- Sex: M
- Nationality: French

Researcher unique identifier: <https://orcid.org/0000-0003-0735-3653>

URL for personal web site: <https://www.linkedin.com/in/eric-cayeux-8b36032/>

### KEY QUALIFICATIONS

- Mathematical modelling of the drilling process, both in mechanical, hydraulic and solid transport terms, resulting in practical industrial applications.
- Design and implementation of advanced real-time systems for machine control, monitoring and decision support.
- Good understanding of the well planning process as well as the drilling operational side
- Broad overview of the use of geophysics, geology and reservoir engineering in the oil & gas industry.
- Extensive experience in combining mathematical modelling with software engineering aspects (experienced Java, C++, C# and Lisp programmer, skilled programmer of 3D interactive graphic, multiple utilization of relational database for technical applications, architect of several real-time drilling applications).

### EDUCATION

2020	Dr. Philos, Petroleum Engineering University of Stavanger, Norway
1986	M. Sc., Software Engineering University of Nice/Sophia Antipolis, France
1985	M. Sc., Civil Engineering Ecole Nationale des Travaux Publics de l'Etat, Lyon, France

### CURRENT AND PREVIOUS POSITIONS

2018-	Chief Scientist, Drilling and Well Modelling NORCE, Norway
2010-2018	Chief Scientist, Drilling and Well Modelling IRIS, Norway
2005-2010	Research Advisor, Drilling and Well Modelling IRIS, Norway
2004-2005	Senior Researcher Drilling and Well Modelling
2003-2004	Well and Production Technology Manager Roxar, Norway
1998-2003	Technical Manager for Well Applications Roxar, Norway
1995-1998	Principle Software Engineer Smedvig Technologies, Norway
1981-1995	Technical Manager Intelligent Petroleum Applications Company, Norway
1988-1991	Software Engineer Cognitech, France

1986-1988      Software Engineer  
 Ministry of Transportation, Service of Technical Studies for Roads and Highways,  
 France

**AWARDS**

2020            North Sea Regional SPE Drilling Engineering Award  
 2019            Outstanding Technical Reviewer Service Award for SPE Drilling & Completion Journal  
 2019            Outstanding Technical Reviewer Service Award for SPE Journal  
 2012            Statoil Research Prize  
 2009            SR-Bank Innovation Prize  
 1993            EC2 Award for Offshore Directional Drilling Advisor (ODDA): Best European AI  
 Application of the year

**SUPERVISION OF GRADUATE STUDENTS AND RESEARCH FELLOWS**

2019-           supervisor for 1 research fellow from Technische Universität Clausthal, Germany  
 2016-           supervisor for 5 research fellows from the University of Texas, Austin, USA  
 2012-           Supervisor for 7 master students in petroleum engineering at the University of  
 Stavanger, Norway.  
 2007           Supervisor for 1 master student in cryptology and information system security,  
 University of Paris-Est Créteil, France  
 2006           Supervisor for 1 master student in computer science at the University of Stavanger,  
 Norway

**ORGANISATION OF SCIENTIFIC MEETINGS**

2019            SPE-DSATS Workshop, session chairman, more than 100 participants, San Antonio,  
 Texas, USA, 29-30 October.  
 2019            SPE-DSATS Interoperability workshop, committee member, 50 participants, Houston,  
 Texas, USA & web, 25-26 April.

**COMMISSIONS OF TRUST**

48 reviews of 36 manuscripts  
 2020-           Reviewer for Minerals (MDPI)  
 2019-           Reviewer for Energies (MDPI)  
 2019-           Reviewer for Measurement (Elsevier)  
 2019-           Reviewer for Journal of Natural Gas Science and Engineering (Elsevier)  
 2019-           Reviewer for ISA Transaction (Elsevier)  
 2018-           Reviewer for Automation in Construction Journal (Elsevier)  
 2017-           Reviewer for SPE Journal (SPE)  
 2015-           Reviewer for SPE Drilling & Completion Journal (SPE)  
 2014-           Reviewer for IFAC (Elsevier)

**MEMBERSHIPS OF SCIENTIFIC SOCIETIES**

1993-           Society of Petroleum Engineers

**Track record**

Publications:

- Peer-reviewed journals: 11 (follow the 10 most cited papers)
  1. Cayeux, E., Mesagan, T., Tanripada, S., Zidan, M., Fjelde, K. K. (2014, March 1). "Real-Time Evaluation of Hole-Cleaning Conditions With a Transient Cuttings-Transport

- Model". SPE Drilling & Completion, **29**, pp. 5-21, part of ISSN: 1064-6671, doi:10.2118/163492-PA, citations: 57.
2. Cayeux, E., Daireaux, B., Dvergsnes, E. W., Florence, F. (2014, June 1). "Toward Drilling Automation: On the Necessity of Using Sensors That Relate to Physical Models". SPE Drilling & Completion, **29**, pp. 236-255, part of ISSN: 1064-6671, doi:10.2118/163440-PA, citations: 42.
  3. Cayeux, E., Daireaux, B., Dvergsnes, E. (2011, December 1). "Automation of Drawworks and Topdrive Management To Minimize Swab/Surge and Poor-Downhole-Condition Effect". SPE Drilling & Completion, **26**, pp. 557-568, part of ISSN: 1064-6671, doi:10.2118/128286-PA, citations: 29.
  4. Iversen, F. P., Cayeux, E., Dvergsnes, E. W., Ervik, R., Welmer, M., & Balov, M. K. (2009, December 1). "Offshore Field Test of a New System for Model Integrated Closed-Loop Drilling Control". SPE Drilling & Completion, **24**, pp. 518-530, part of ISSN: 1064-6671, doi:10.2118/112744-PA, citations: 28.
  5. Cayeux, E., Daireaux, B., Dvergsnes, E., Sælevik, G. (2012, December 1). "Early Symptom Detection on the Basis of Real-Time Evaluation of Downhole Conditions: Principles and Results From Several North Sea Drilling Operations". SPE Drilling & Completion, **27**, pp. 546-558, part of ISSN: 1064-6671, doi:10.2118/150422-PA, citations: 25.
  6. Cayeux, E., Daireaux, B., Dvergsnes, E. (2011, March 1). "Automation of Mud-Pump Management: Application to Drilling Operations in the North Sea". SPE Drilling & Completion, **26**, pp. 41-51, part of ISSN: 1064-6671, doi:10.2118/128285-PA, citations: 21.
  7. Cayeux, E., Daireaux, B. (2016, March 1). "Insights Into the Physical Phenomena That Influence Automatic Gain/Loss Detection During Drilling Operations". SPE Drilling & Completion, **32**, pp.13-24, part of ISSN: 1064-6671, doi:10.2118/166801-PA, citations: 11.
  8. Cayeux, E., Daireaux, B., Dvergsnes, E., Leulseged, A., Bruun, B., Herbert, M. (2012, December 1). "Advanced Drilling Simulation Environment for Testing New Drilling Automation Techniques and Practices". SPE Drilling & Completion, **27**, pp. 559-573, part of ISSN: 1064-6671, doi:10.2118/150941-PA, citations: 10.
  9. Cayeux, E., Shor, R., Ambrus, A., Pournazari, P., Ashok, P., van Oort, E., 2018. "From shallow horizontal drilling to ERD wells: How scale affects drillability and the management of drilling incidents". Journal of Petroleum Science and Engineering, **160**, pp. 91-105, ISSN 0920-4105, doi:10.1016/j.petrol.2017.10.026, citations: 5.
  10. Cayeux, E., Kucs, R., Gibson, N. (2014, December 1). "Mathematical Modeling of Drilling Operations by Use of Nitrogen-Enriched Mud: A Case Study by Use of a Recorded Drilling Data-Set". SPE Drilling & Completion, **29**, pp. 438-453, part of ISSN: 1064-6671, doi:10.2118/167884-PA.
- Peer-reviewed conferences: 10 (follow the 10 most cited papers)
    1. Cayeux, E. (2012). Safe Mud Pump Management while Conditioning Mud: On the Adverse Effects of Complex Heat Transfer and Barite Sag when Establishing Circulation. IFAC Proceedings Volumes 45 (8), pp. 231-238, doi: 0.3182/20120531-2-NO-4020.00018, citations: 8.
    2. Cayeux, E., Skadsem, H.J. (2017). Modelling of the dynamic behavior of the power transmission of an automatic small scale drilling rig. ASME 2017 36th International Conference on Ocean, Offshore and Arctic Engineering, Trondheim, Norway, doi: 10.1115/OMAE2017-62523, citations: 5.

3. Cayeux, E., Lande, H. P., 2013. Factors Influencing the Estimation of Downhole Pressure far Away From Measurement Points During Drilling Operations. SIMS 2013 conference in Bergen, Norway, citations: 5.
  4. Cayeux, E., Skadsem, H.P., 2014. Estimation of weight and torque on bit: Assessment of uncertainties, correction and calibration methods. ASME 2014 33rd International Conference on Ocean, Offshore and Arctic Engineering, San Francisco, Ca, USA, doi: 10.1115/OMAE2014-23866, citations: 4.
  5. Cayeux, E., Leulseged, A., 2018. Modelling of Drilling Fluid Thixotropy. ASME 2018 37th International Conference on Ocean, Offshore and Arctic Engineering, Madrid, Spain, doi: 10.1115/OMAE2018-77203, citations: 2.
  6. Cayeux, E., 2017. Automatic Risk Uncertainty Estimation to Support Decision Making during Drilling Operation Planning: Case Study on an ERD Well. OIL GAS-EUROPEAN MAGAZINE 43 (1), OG26-OG28, ISSN 0342-5622
  7. Cayeux, E., 2015. Getting it Right: Balancing Model Complexity, Margin and Risk with the Right Measurements. OIL GAS-EUROPEAN MAGAZINE 41 (1), ISSN 0342-5622
  8. Cayeux, E. 2019. Modelling of the Movement of a Prolate Particle in the Steady State Flow of a Non-Newtonian Fluid in an Inclined Annulus With Inner String Rotation. ASME 2019 38th International Conference on Ocean, Offshore and Arctic Engineering, Glasgow, Scotland, UK, doi: 10.1115/OMAE2019-95049.
  9. Dvergsnes, E.W., Cayeux, E., 2019. On the Importance of the Coupling Between Transient Mechanical, Hydraulic and Thermal Effects for the Modelling of Real-Time Drilling Operations. ASME 2019 38th International Conference on Ocean, Offshore and Arctic Engineering, Glasgow, Scotland, UK, doi: 10.1115/OMAE2019-95062.
  10. Cayeux, E., Leulseged, A., 2020. Characterization of the Rheological Behavior of Drilling Fluids. ASME 2020 39th International Conference on Ocean, Offshore and Arctic Engineering, Fort Lauderdale, FL, USA, doi: 10.1115/OMAE2020-19288.
- Conference papers: 35 (follow the 10 most cited papers)
    1. Iversen, F. P., Cayeux, E., Dvergsnes, E. W., Gravdal, J. E., Vefring, E. H., Mykletun, B., Torsvoll, A., Omdal, S., Merlo, A. (2006). Monitoring and Control of Drilling Utilizing Continuously Updated Process Models. Society of Petroleum Engineers. doi:10.2118/99207-MS, citations: 40.
    2. Cayeux, E., & Daireaux, B. (2009). Early Detection of Drilling Conditions Deterioration Using Real-Time Calibration of Computer Models: Field Example from North Sea Drilling Operations. Society of Petroleum Engineers. doi:10.2118/119435-MS, citations: 28.
    3. Cayeux, E., Dvergsnes, E. W., & Iversen, F. P. (2009). Real-Time Optimization of the Drilling Process - Challenges in Industrialization. Society of Petroleum Engineers. doi:10.2118/119650-MS, citations: 27
    4. Iversen, F. P., Cayeux, E., Dvergsnes, E. W., Ervik, R., Byrkjeland, M., Welmer, M., Torsvoll, A., Balov, M., Haugstad, E., Merlo, A. (2008). Offshore Field Test of a New Integrated System for Real-Time Optimization of the Drilling Process. Society of Petroleum Engineers. doi:10.2118/112744-MS, citations: 20.
    5. Cayeux, E., & Daireaux, B. (2013). Precise Gain and Loss Detection Using a Transient Hydraulic Model of the Return Flow to the Pit. Society of Petroleum Engineers. doi:10.2118/166801-MS, citations: 19.
    6. Cayeux, E., Daireaux, B., Dvergsnes, E. W., Sælevik, G., & Zidan, M. (2012). An Early Warning System for Identifying Drilling Problems: An Example From a Problematic Drill-Out Cement Operation in the North-Sea. Society of Petroleum Engineers. doi:10.2118/150942-MS, citations: 19

7. Cayeux, E., Daireaax, B., Dvergsnes, E., & Sælevik, G. (2012). Early Symptom Detection Based on Real-Time Evaluation of Downhole Conditions: Principles and Results from several North Sea Drilling Operations. Society of Petroleum Engineers. doi:10.2118/150422-MS, citations: 13.
8. Cayeux, E. (2018). On the Importance of Boundary Conditions for Real-Time Transient Drill-String Mechanical Estimations. Society of Petroleum Engineers. doi:10.2118/189642-MS, citations: 12
9. Cayeux, E., Skadsem, H. J., Daireaax, B., & Holand, R. (2017). Challenges and Solutions to the Correct Interpretation of Drilling Friction Tests. Society of Petroleum Engineers. doi:10.2118/184657-MS, citations: 10.
10. Cayeux, E., Leulseged, A., Kluge, R., & Haga, J. (2016). Use of a Transient Cuttings Transport Model in the Planning, Monitoring and Post Analysis of Complex Drilling Operations in the North Sea. Society of Petroleum Engineers. doi:10.2118/178862-MS, citations: 10.

#### Granted patents:

- US9605532B2, Method and device for determining a drill bit's position in a borehole, issued Mar 28, 2017, <https://patents.google.com/patent/US9605532B2/en>
- US9175557B2, Drilling control method and system, issued Nov 3, 2015, <https://patents.google.com/patent/US9175557B2/en>
- US20140246243A1, Device and method for pressure regulation of a well, issued Apr 9, 2014, <https://patents.google.com/patent/US20140246243A1/en>
- US20130332125A1, Earth model, issued Dec 12, 2013, <https://patents.google.com/patent/US20130332125A1/en>
- US20080314644A1, Device for a Borehole Arrangement, issued Dec 25, 2008, <https://patents.google.com/patent/US20080314644A1/en>

#### Invited presentations to peer-reviewed conferences:

- Cayeux, E., 2019. "Modelling of the Movement of a Prolate Particle in the Steady State Flow of a Non-Newtonian Fluid in an Inclined Annulus with Inner String Rotation". ASME/OMAE, doi:10.1115/OMAE2019-95049
- Cayeux, E., Skadsem, H.J, 2014. "Estimation of Weight and Torque on Bit: Assessment of Uncertainties, Correction and Calibration Methods". ASME/OMAE, Volume 5: Materials Technology; Petroleum Technology: V005T11A013, doi:10.1115/OMAE2014-23866, citation: 4.

#### Leadership in Industrial Innovation or design:

- Design and development of DrillScene, a real-time symptom detection application for drilling operations, now commercialized by SEKAL AS (<https://sekal.com/products/drillscene/>)
- Design and development of DrillTronics, a real-time drilling assistance system for drilling operations, now commercialized by SEKAL AS (<https://sekal.com/products/drilltronics/>)
- Design and development of RMSWellplan, a well planning application for multi-disciplinary teams including geophysicists, geologists, reservoir and drilling engineers, originally commercialized by ROXAR AS (<https://www.emerson.com/documents/automation/data-sheet-rms-well-planning-2014-roxar-en-82038.pdf>)
- Design and development of the Offshore Directional Drilling Advisor (ODDA), an expert system for the design of rotary bottom hole assemblies and constraint-based well path construction, Cayeux, E., 1992. "The ODDA System: Integration of Conventional Programming and Artificial Intelligence". Oil & Gas Science and Technology - Rev. IFP Vol. 47 (1992), No.3, pp. 325-332, doi: 10.2516/ogst:1992023.