Curriculum Vitae of
Dr. Shaaban Ali Bakr

- **Personal information**
  - ✓ Family name, First name: Bakr, Shaaban
  - ✓ Date of birth: 6/4/1975 (d/m/year)
  - ✓ email: shaaban.bakr1@gmail.com
  - ✓ website: https://sites.google.com/site/shaabanalibakr/

- **Education**
  - ✓ 2007–2010 PhD, Department of mathematics, University of Bergen, Norway
  - ✓ 2000–2003 Master, Department of mathematics, University of Assiut, Egypt
  - ✓ 1998–1999 Pre-Master, Department of mathematics, University of Assiut, Egypt
  - ✓ 1993–1997 B.Sc. (Distinction with Honour), Department of mathematics, University of Assiut, Egypt

- **Current position(s)**
  - ✓ 2016–Present, Assistant Professor, Department of mathematics, University of Assiut, Egypt

- **Previous positions**
  - ✓ 2014–2016, Post Doctoral Fellow, BCAM (Basque Center for Applied Mathematics), Bilbao, Spain
  - ✓ 2013–2014 Assistant Professor, Department of mathematics, University of Assiut, Egypt, and Consultant, CIPR (Centre for Integrated Petroleum Research), Bergen, Norway
  - ✓ 2010–2013 Post-Doctoral Fellow, CIPR, Bergen, Norway
  - ✓ 2007–2010 PhD researcher, CIPR, Bergen, Norway
  - ✓ 2003–2007 Assistant Lecturer, Department of mathematics, University of Assiut, Egypt
  - ✓ 1997–2003 Demonstrator, Department of mathematics, University of Assiut, Egypt

- **Fellowships and awards**
  - ✓ 2014–2016 Post Doctoral Fellow, BCAM, Bilbao, Spain
  - ✓ 2014 Award from 76th EAGE Conference and Exhibition, Amsterdam, the Netherlands
  - ✓ 2014 Award from 4th ISCYR, Assiut University, Egypt
  - ✓ 2013–2014 Consultant, CIPR, Bergen, Norway
  - ✓ 2010–2013 Post Doctoral Fellow, CIPR, Bergen, Norway
  - ✓ 2007–2010 PhD researcher, CIPR, Bergen, Norway

- **Invited presentations**
  - ✓ Invited lecture, October 4th, 2015. University of Alexandria, Alexandria, Egypt. Topic: Domain decomposition Fourier finite element method for the simulation of 3D marine CSEM measurements
  - ✓ Mini Seminar on Modeling and Inversion of Geophysical Data, March 26th, 2015. CIPR, Bergen, Norway. Topic: A dimensionally adaptive method (DAM) for the simulation of 3D Marine CSEM measurements.
  - ✓ ICMIS (International Conference on Mathematics & Information Science); February 5-7, 2015. Zewail City of Science and Technology, Cairo, Egypt. Topic: 3D Simulations of Marine CSEM measurements using dimensionally adaptive methods.
  - ✓ ISCYR (International Science Conference for Young Researchers); Assiut, Egypt, 2014. Topic: A Fourier finite element method for the simulation of 3D marine CSEM measurements.
  - ✓ PIERS (Progress in electromagnetics research symposium); Cambridge, USA, 2010. Topic: Simplified integral equation modeling of low-frequency electromagnetic scattering from a resistive underground target.

- **Supervision of graduate students and postdoctoral fellows**

  - ✓ 2015–Present, Co-Supervisor with Prof. David Pardo of Mostafa Shahriari, PhD student at BCAM and University of Basque Country, Bilbao. Topic: Fast One-Dimensional Finite Element Approximations of

Geophysical Measurements.

- ✓ 2011–2014, Co-Supervisor with Prof. Trond Mannseth of Svenn Tveit, PhD student at CIPR and the Department of Mathematics, University of Bergen, Norway. Topic: Robust inversion of CSEM data.

- **Commissions of trust**

  - ✓ 2016, member of the scientific committee and co-organizer of the workshop on Numerical resolution of inverse problems II, 14-15 January 2016, Bilbao, Spain.
  - ✓ 2015–Present, Coordinate all BCAM efforts on the European Project "Geophysical Exploration using Advanced Galerkin Methods (GEAGAM)" led by Prof. David Pardo.
  - ✓ 2015, member of the scientific committee and co-organizer of the workshop on Advanced Subsurface Visualization Methods: "Exploring the Earth", 26-27 May 2015, Pau, France.
  - ✓ 2010–Present, Reviewer for the following journals: Computational Geosciences, Numerical Algorithms, Applied Mathematics and Computation, PIERS and Egyptian Journal of Basic and Applied Sciences.

- **Teaching activities**

  I have extensive experience teaching undergraduate and postgraduate courses at Assiut University, Egypt and postgraduate courses at BCAM, Bilbao, Spain:

  - ➢ Undergraduate courses
    - ✓ Instructor: Spring 2017
      - ❖ Differential equations
      - ❖ Numerical Analysis
    - ✓ Instructor: Spring 2014
      - ❖ Application of computer science
      - ❖ Numerical Analysis
    - ✓ Instructor: Fall 2013
      - ❖ Basic calculus
      - ❖ Advanced calculus
      - ❖ Applications of computer science
    - ✓ Co-Instructor: Spring 1999–Fall 2006
      - ❖ Basic calculus
      - ❖ Advanced calculus
      - ❖ Numerical analysis
      - ❖ Differential equations
    - ✓ Co-Instructor: Fall 1997
      - ❖ Basic calculus
      - ❖ Differential equations
  - ➢ Postgraduate courses
    - ✓ Instructor: Spring 2016
      - ❖ Parameter estimation and inverse problems. BCAM, Bilbao, Spain.
    - ✓ Instructor: Fall 2016
      - ❖ Numerical analysis, for pre-master students of computer sciences and physics departments. Assiut University.

- **Short courses**
  - ✓ 2016, Coding the finite element method with geophysical applications, BCAM, Bilbao.
  - ✓ 2016, Introduction to parallel programming, BCAM, Bilbao.
  - ✓ 2016, Certified reduced basis methods for computational mechanics, BCAM, Bilbao.
  - ✓ 2015, Parallel programming and optimization, BCAM, Bilbao.
  - ✓ 2015, Computational Bayesian inverse problems, BCAM, Bilbao.
  - ✓ 2011, DUNE/PDELap course, Interdisciplinary Center for Scientific Computing, Heidelberg University.

- **Short workshops**
  - ✓ 2016, Bergen workshop on computational and applied mathematics, Bergen University College, Bergen, Norway, 18-19 January 2016.

- ✓ 2016, Numerical resolution of inverse problems II, BCAM workshop, Bilbao, Spain, 14-15 January 2016.
- ✓ 2015, Advanced Subsurface Visualization Methods: "Exploring the Earth", Pau, France, 26-27 May 2015.
- ✓ 2015, The second Basque-Hungarian workshop on numerical methods for PDEs, BCAM workshop, Bilbao, Spain, 12-13 January 2015.
- ✓ 2015, Numerical resolution for inverse problems, BCAM workshop, Bilbao, Spain, 8-9 January 2015.
- ✓ 2014, Third international workshop on multiphysics, multiscale, and optimization problems, 22-23 May, 2014, Bilbao, Spain.
- ✓ 2008, Uncertainty analysis in geophysical imaging, estimation, and inverse problems, SEG 78th International Exposition and Annual Meeting, Las Vegas, USA, 9-14 November 2008.
- ✓ 2006, Numerical Methods for Problems with Layer Phenomena, 5th Annual Workshop, University of Limerick, Ireland, 10-11 February, 2006.

- **Research stays**
  - ✓ 7–8/2017, BCAM (Basque Center for Applied Mathematics), Bilbao, Spain. Research topic: Numerical treatment of singularly perturbed fractional PDEs with time delay.
  - ✓ 7–8/2015, with Prof. Carlos Torres-Verdín, Department of Petroleum Engineering, University of Texas at Austin, USA. Research topic: Fast 1D inversion of multi-well resistivity logging data obtained in 3D model formations.
  - ✓ 9–12/2012, with Prof. David Pardo, University of the Basque Country, Bilbao, Spain. Research topic: Fourier finite element method for the simulation of 3D marine CSEM measurements.

- **Memberships of scientific societies**
  - ✓ 2015-Present, Member, "EMS: European Mathematical Society"
  - ✓ 2015-Present, Member, "ETMS: Egyptian Mathematical Society"
  - ✓ 2010, 2012, 2014, Member, "EAGE: European Association of Geoscientists and Engineers"
  - ✓ 2007, 2008, 2014, Member, "SEG: Society of Exploration Geophysicists"

- **Major collaborations**
  - ✓ **Prof. David Pardo,** Applied finite element methods to geophysical applications, BCAM, Bilbao, Spain. dzubiaur@gmail.com
  - ✓ **Prof. Trond Mannseth,** Robust inversion of CSEM data, Uni Research CIPR, Bergen, Norway. Trond.Mannseth@uni.no
  - ✓ **Dr. Martha Lien**, Robust inversion of CSEM data, Octio, Bergen, Norway. martha.lien@octio.com
  - ✓ **Dr. Svenn Tveit**, Robust inversion of CSEM data, Uni Research CIPR, Bergen, Norway. svenn.tveit@uni.no
  - ✓ **Prof. Carlos Torres-Verdín,** Fast 1D inversion of resistivity logging data, Department of Petroleum and Geosystems Engineering, The University of Texas at Austin, Austin, TX, USA. cverdin@austin.utexas.edu
  - ✓ **Prof. Ali Ansari,** Singularly perturbed delay parabolic PDEs, Gulf University for Science & Technology, Kuwait. ansari.a@gust.edu.kw
  - ✓ **Prof. Abdelhay Salama,** Singularly perturbed ODEs and Volterra integro-differential problems, Assiut University, Egypt. salamaazoz@yahoo.com

- **Research interest**
  - ✓ Numerical methods (finite element, finite volume, integral equation, finite difference) for high performance scientific computing.
  - ✓ Numerical modelling and inversion of geophysical data.
  - ✓ Dimensionally adaptive methods for simulation and inversion of geophysical measurements.
  - ✓ Numerical methods for singularly perturbed problems (ODEs, PDEs, and delay PDEs).

- **Publications**

1. **S.A. Bakr**, D. Pardo, A multi-domain decomposition based Fourier finite element method for the simulation of 3D marine CSEM measurements, Computational Geosciences, 21 (3), 345-357, 2017. **(Impact factor: 1.99)**
2. **S.A. Bakr**, D. Pardo, Carlos Torres-Verdin, Fast inversion of logging-while-drilling resistivity measurements acquired in multiple wells, Geophysics, 82 (3), E111-E120, 2017. **(Impact factor: 2.017)**

3. T. Aboelenen, **S.A. Bakr**, H. M. El-Hawary, Fractional Laguerre spectral methods and their applications to fractional differential equations on unbounded domain, International Journal of Computer Mathematics, 94 (3), 570-596, 2017. **(Impact factor: 0.825)**
4. S. Tveit, **S.A. Bakr**, M. Lien, T. Mannseth, Ensemble-based, Bayesian inversion of CSEM data for subsurface structure identification, Geophysical J. Int., 201 (3), 1849-1867, (2015), doi:10.1093/gji/ggv114. **(Impact factor: 2.922)**
5. S. Tveit, **S.A. Bakr**, M. Lien, T. Mannseth, Identification of subsurface structures using electromagnetic data and shape priors, Journal of Computational Physics, Vol. 284, (2015), 505-527. **(Impact factor: 2.434)**
6. **S.A. Bakr**, D. Pardo, T. Mannseth**,** Domain decomposition Fourier finite element method for the simulation of 3D marine CSEM measurements, Journal of Computational Physics, Vol. 255, (2013), 456-470, http://dx.doi.org/10.1016/j.jcp.2013.08.041. **(Impact factor: 2.434)**
7. **S.A. Bakr**, T. Mannseth**,** An approximate hybrid method for electromagnetic scattering from an underground target, IEEE Trans. Geosci. Remote Sens., Vol. 51, No. 1, (2013), 99-107. **(Impact factor: 3.467)**
8. **S.A. Bakr,** A 2.5D Finite element method for modeling of electromagnetic tensor Green's functions on a triangular mesh: Uni Research, Centre for Integrated Petroleum Research, No. 1, (2012), 1-32.
9. **S.A. Bakr**, T. Mannseth**,** Computational complexity and cost of an approximate hybrid method for electromagnetic scattering from an underground target , Technical report, UC 03, (2011). http://www.cipr.uni.no/contentitem.aspx?ci=2120.
10. **S.A. Bakr**, T. Mannseth**,** Feasibility of simplified integral equation modeling of low-frequency marine CSEM with a resistive target. Geophysics, 74 (2009), F107-F117. **(Impact factor: 1.723)**
11. A.R. Ansari, **S.A. Bakr**, G.I. Shishkin, A parameter-robust finite difference method for singularly perturbed delay parabolic partial differential equations, J. Comput. Appl. Math., 205, (2007), 552-566. **(Impact factor: 1.266)**
12. A.A. Salama, **S.A. Bakr**, Difference schemes of exponential type for singularly perturbed Volterra integro-differential problems, Appl. Math. Modeling, 31, (2007), 866-879. **(Impact factor: 2.251)**
13. A.A. Salama, **S.A. Bakr**, Optimal extended one-step schemes of exponential type for singularly perturbed initial-value problems, Int. J. Comp. Math., 81, (2004), 1363-1379. **(Impact factor: 0.825)**

- **Conference proceeding papers**
  1. D. Pardo, C. Torres-Verdin, **S.A. Bakr,** Fast and automatic inversion of LWD resistivity measurements for petrophysical interpretation, SPWLA 56th Annual Logging Symposium, 2015.
  2. J. Alvarez-Aramberri, **S.A. Bakr**, D. Pardo, H. Barucq, Quantities of Interest for Surface based Resistivity Geophysical Measurements, Procedia Computer Science, 2015.
  3. **S.A. Bakr**, D. Pardo**,** A Secondary field based Fourier finite element method for the simulation of 3D marine measurements, SEG 84th International Exposition and Annual Meeting, (Extended abstracts), Colorado, Denver, USA 26-31 October 2014.
  4. S. Tveit, **S.A. Bakr**, M. Lien, T. Mannseth**,** Ensemble-based, Bayesian Inversion of CSEM Data Using Structural Prior Information, EAGE 76th International Exposition and Annual Meeting, (Expanded abstracts), Amsterdam, The Netherland, June 2014.
  5. **S.A. Bakr**, T. Mannseth**,** Hybrid Method for Modeling the CSEM Response of a Complex Geoelectrical Subsurface, EAGE 76th International Exposition and Annual Meeting, (Expanded abstracts), Amsterdam, The Netherland, June 2014.
  6. **S.A. Bakr**, M.Ø. Lien, T. Mannseth**,** Performance of a fast approximate solver in identification of electric conductivity changes from time-lapse CSEM, EAGE 74th International Exposition and Annual Meeting, (Expanded abstracts), Copenhagen, Denmark, June 2012.
  7. **S.A. Bakr**, T. Mannseth**,** Order-of-magnitude analysis of the range of validity of a low-frequency approximation for CSEM, SEG 81st International Exposition and Annual Meeting, (Extended abstracts), San Antonio, Texas, USA 18-23 September 2011.
  8. **S.A. Bakr**, T. Mannseth**,** Numerical investigation of the range of validity of a low-frequency approximation for CSEM. EAGE 72nd International Exposition and Annual Meeting, (Expanded abstracts), Barcelona, Spain, June 2010.
  9. **S.A. Bakr**, T. Mannseth**,** Fast 3D modeling of the CSEM response of petroleum reservoirs. SEG 79th International Exposition and Annual Meeting, (Extended abstracts), Houston, TX, USA, 25-30 October 2009.

10. **S.A. Bakr**, A.R. Ansari, G.I. Shishkin; High-order numerical methods for singularly perturbed delay parabolic partial differential equations, The Second International Conference on Mathematics: Trends and Developments, ICMTD07, Cairo, Egypt, 27-30 December 2007.

- **Conference and workshop presentations**

1. **S.A. Bakr**, D. Pardo; A multi-domain decomposition based Fourier finite element method for the simulation of 3D marine CSEM measurements, Alexandria University, July 26, 2016, in Alexandria, Egypt.
2. **S.A. Bakr**, D. Pardo; Fast inversion of logging-while-drilling resistivity measurements acquired in multiple wells, Assiut University, April 14, 2016, in Assiut, Egypt.
3. **S.A. Bakr**, D. Pardo; Fast inversion of logging-while-drilling resistivity measurements acquired in multiple wells, Bergen workshop on computational and applied mathematics, January 18-19, 2016, in Bergen, Norway.
4. **S.A. Bakr**, D. Pardo; Fast inversion of logging-while-drilling resistivity measurements acquired in multiple wells, Second international workshop on numerical resolution of inverse problems II, January 14-15, 2016, in Bilbao, Spain.
5. **S.A. Bakr**, D. Pardo, C. Torres-Verdín; Advances in the fast inversion of electromagnetic LWD resistivity measurements acquired in multiple wells, Joint industry research consortium on formation evaluation, 15th Annual meeting 2015, The University of Texas at Austin, Austin TX, USA.
6. **S.A. Bakr**, D. Pardo; 3D Simulations of Marine CSEM measurements using dimensionally adaptive methods. Feberurary 5-7, 2015. Zewail City of Science and Technology, ICMIS (International Conference on Mathematics & Information Science), Cairo, Egypt.
7. Tarek Aboelenen, **S.A. Bakr**, Hassan M. El-Hawary; Fractional Laguerre Spectral Methods and Their Applications to Fractional Differential Equations on Unbounded Domain. February 5-7, 2015. Zewail City of Science and Technology, ICMIS (International Conference on Mathematics & Information Science), Cairo, Egypt.
8. D. Pardo, **S.A. Bakr**, C. Torres-Verdin; Dimensionally Adaptive Methods for the Simulation and Inversion of Resistivity Geophysical. January 7-9, 2015. Valparaíso's Mathematics and its Applications Days (V-MAD 5), Chile
9. **S.A. Bakr**, D. Pardo; Dimensionally adaptive methods for the simulation of 3D marine CSEM measurements. December 2, 2014 at 16:00. BCAM-Basque Center for Applied Mathematics, Bilbao, Basque Country, Spain.
10. **S.A. Bakr**, D. Pardo, T. Mannseth; A Fourier finite element method for the simulation of 3D marine CSEM measurements. Third international workshop on multiphysics, multiscale, and optimization problems, May 22-23, 2014, in Bilbao, Spain.
11. **S.A. Bakr**, D. Pardo, T. Mannseth; Domain decomposition Fourier finite element method for the simulation of 3D marine CSEM measurements. ISCYR (International Science Conference for Young Researchers), April 2014; Assiut, Egypt.
12. **S.A. Bakr**, D. Pardo, T. Mannseth; 3D Simulations of Marine CSEM measurements using a Fourier Finite Element method, Universidad Federico Santa Maria, January 2014, Valparaiso, Chile.
13. **S.A. Bakr**, D. Pardo, T. Mannseth; Domain decomposition Fourier finite element method for the simulation of 3D marine CSEM measurements. BCAM Seminar-Basque Center for Applied Mathematics, Nov. 25-29, 2013, in Bilbao, Spain. http://www.bcamath.org/en/seminars/bcamseminar20131128sb/archives.
14. S. Tveit, **S.A. Bakr**, M. Lien, T. Mannseth; Multi-Level Estimation of a Layered Subsurface from Sea Floor Electromagnetic Data. SIAM Conference on Mathematical & Computational Issues in the Geosciences (GS13), June 17 - 20, 2013, in Padua, Italy.
15. **S.A. Bakr**, D. Pardo, T. Mannseth; A Fourier finite element method for the simulation of 3D marine CSEM measurements. SIAM Conference on Mathematical & Computational Issues in the Geosciences (GS13), June 17 - 20, 2013, in Padua, Italy.
16. **S.A. Bakr**, D. Pardo, T. Mannseth; A Fourier finite element method with application to 3D marine CSEM simulation, Centre for Integrated Petroleum Research (CIPR), March, 2013, Bergen, Norway.
17. **S.A. Bakr**, T. Mannseth; Simplified integral equation modeling of low-frequency electromagnetic scattering from a resistive underground target, PIERS-Progress in electromagnetics research symposium; Cambridge, USA, 2010.
18. **S.A. Bakr**, T. Mannseth; An approximate hybrid method for electromagnetic scattering from an underground target, CIPR - Petroleum Technology Seminar, Bergen 10-11 May 2010.

19. **S.A. Bakr**, T. Mannseth; Fast 3D modeling of the low-frequency CSEM response of petroleum reservoirs. Open workshop on High-Precision Characterisation of Electromagnetic Fields in Sea Water, at The Michelsen Centre, 16 October 2009, Bergen, Norway.
20. **S. A. Bakr**, T. Mannseth; Hybrid method for low-frequency electromagnetic scattering from a resistive underground target. Siam conference on mathematical & computational issues in the geosciences, June 15-18, 2009, Leipzig, Germany.
21. **S. A. Bakr**, M.Ø. Lien, I. Berre, T. Mannseth, Marine CSEM data for reservoir production monitoring: Feasibility and initial identification results, PIERS-Progress in electromagnetics research symposium; Cambridge, USA, 2-6 July, 2008.
22. A. Ansari, **S. A. Bakr** and G. I. Shishkin, Numerical treatment of singularly perturbed delay parabolic partial differential equations, Numerical Methods for Problems with Layer Phenomena, 5th Annual Workshop February 10-11, University of Limerick, 2006.