

Curriculum Vitae

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Mathematics Department.
Engineering Faculty
Cairo University,
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Google Scholar Page:

<https://scholar.google.com/citations?user=LI-TDTcAAAAJ&hl=en>

- **PhD:** Applied Mathematics (2008)
Awarded by: Cairo University, Engineering Faculty, Engineering Mathematics. & Physics Department, With one year in Salzburg University (Austria).
Thesis Title: “On the Serial and Parallel Finite-Volume Solutions of the Incompressible Navier-Stokes Equations Using Unstructured Grids”
- **MSc:** Applied Mathematics (2000)
Awarded by: Cairo University, Engineering Faculty, Engineering Mathematics. & Physics Department.
- **Diploma:** Mathematics (1998)
Awarded by: Cairo University, Engineering Faculty, Engineering Mathematics. & Physics Department, 1998.
- **BSc:** Aerospace Engineering (1995)
Awarded by: Cairo University, Engineering Faculty, Aerospace Department.
Graduation Project: Aerodynamic Design of Airplane Wings

Previous occupations and Experience:

- 1- Associate Professor at Cairo University, Engineering Faculty, Eng. Mathematics Department, January 2014 – Present.
- 2- Associate Professor at Effat University, Jeddah, Saudi Arabia, August 2013 – July 2016 (Staff of Basic Sciences).
- 3- Assistant Professor at the Egyptian E-Learning University (EELU) in the IT/Mathematics department, 2011-2013.
- 4- Assistant Professor at Cairo University, 2008 – 2014 in the Department of Engineering Mathematics.
- 5- Team manager in the Applied Science Inc. (ASI) company (<http://www.appliedscienceint.com>), Mathematics Dept., 2006-2010.
- 6- Consultant in (ASI) Mathematics for the Applied Science Inc., 2010-Present.
- 7- T.A. at Cairo University, 1997 – 2008 in the Department of Engineering Mathematics.

Teaching Activities:

- Mathematics (Functional Analysis, Numerical Analysis, Stochastic Processes, Probability and Statistics, Stochastic Differential Equations, Calculus, Linear Algebra, Differential Equations, Partial Differential Equations, Series, Fourier Analysis)
- Computer Programming: Professional in (C++, Visual Basic, FORTRAN, JAVA, MATLAB)

Teaching Technology:

- Professionally use the Blackboard, Moodle and the SMART techniques in teaching. This includes 3 years experience in Saudi-Arabia using Blackboard, 2 years experience in the Egyptian E-Learning University using SMART tools and 3 years experience at the Nile University using Moodle.

Research Activities:

- Stochastic processes.
- Numerical solutions of partial differential equations.
- Fluid Mechanics and many engineering applications
- Stochastic processes and Stochastic DE/PDEs.
- Random and Stochastic FVM/FEM.

Conference Papers:

- 1- M. El-Beltagy, A. Sherif, and A. Seddik, “Unstructured FV Solver for the Two-Dimensional Laminar Backstep Flow Using Vorticity-Stream Function”.

- Proceedings of the 8th International Conference of Fluid Dynamics and Propulsion A.S.M.E., Sharm El-Shiekh, Egypt. Paper ICFDP8-EG-199, (2006).
- 2- M. El-Beltagy, O. Galal and M. Wafa, "Uncertainty Quantification of a 1-D Beam Deflection Due to Stochastic Parameters", NUMERICAL ANALYSIS AND APPLIED MATHEMATICS ICNAAM 2011. AIP Conference Proceedings, Volume 1389, pp. 2000-2003, DOI: 10.1063/1.3637007 (2011). (http://proceedings.aip.org/resource/2/apcpcs/1389/1/2000_1)
 - 3- A. Al-Johani and M. El-Beltagy, "Numerical Solution of Stochastic Nonlinear Differential Equations Using Wiener-Hermite Expansion", 11TH INTERNATIONAL CONFERENCE OF NUMERICAL ANALYSIS AND APPLIED MATHEMATICS 2013: ICNAAM 2013. AIP Conference Proceedings, Volume 1558, pp. 2099-2102 (2013).
 - 4- A. Khalil, H. Salem, H. Helmy, N. Abd Elhaleem and M. El-Beltagy, "Using Applied Element Method to Predict Seismic Vibration Due to Demolition", The 12th Arab Structural Engineering Conference, Tripoli, Libya, December 2013.
 - 5- M. El-Beltagy, Amnah S. Al-Juhani "Solution of Stochastic Nonlinear PDEs Using Automated Wiener-Hermite Expansion", UQAW 2014, KAUST, KSA, January 2014.
 - 6- M. El-Beltagy, N. Al-Mulla "Higher-order Solution of Stochastic Diffusion equation with Nonlinear Losses Using WHEP technique", UQAW 2014, KAUST, KSA, January 2014.
 - 7- Mohamed A. El-Beltagy and Amnah S. Al-Juhani "Numerical Solution of Stochastic Nonlinear Fractional Differential Equations" UQAW 2015 – Poster, <https://sri-ug.kaust.edu.sa/Pages/UQAnnualWorkshop2015.aspx>
 - 8- M. Al-Nory and M. A. El-Beltagy, "Optimal selection of energy storage systems", IEEE Smart Grid Conference (SASG 2015), Jeddah, KSA. DOI: [10.1109/SASG.2015.7449273](https://doi.org/10.1109/SASG.2015.7449273)
 - 9- M. El-Beltagy – Oral Presentation "Solution of stochastic nonlinear PDEs using Wiener-Hermite expansion of high orders", UQAW 2016, https://sri-ug.kaust.edu.sa/Pages/UQAW_2016_slides.aspx

- 10- M. El-Beltagy – Oral Presentation “Comparative study of the spectral stochastic techniques in solving PDEs”, COMUS17 (<https://comus17.com/>), Porto, Portugal, September 2017.
- 11- S. A. Nagy and M. A. El-Beltagy, 2019, "Numerical simulation of the stochastic Burgers' equation using MLMC and CBC algorithm", 18th International Conference on Aerospace Sciences & Aviation Technology, IOP Conf. Series: Materials Science and Engineering 610 (2019) 012081, IOP Publishing, doi:10.1088/1757-899X/610/1/012081.
- 12- S. A. Nagy and M. A. El-Beltagy, "Multi-level Monte Carlo Simulation on Particle Filters and Extended Kalman Filters.," 2019 Novel Intelligent and Leading Emerging Sciences Conference (NILES), Giza, Egypt, 2019, pp. 146-149. doi: 10.1109/NILES.2019.8909315

Journal Papers:

- 13- A. Khalil, M. Hesham, and M. El-Beltagy, "Domain-limited solution of the wave equation in Riemannian coordinates." GEOPHYSICS, 78(1), T21–T27. doi:10.1190/geo2012-0027.1 (2013). (<http://library.seg.org/doi/abs/10.1190/geo2012-0027.1?journalCode=gpya7>)
- 14- Said R. Grace, John R. Graef, Mohamed A. El-Beltagy, “On the oscillation of third order neutral delay dynamic equations on time scales”. ELSEVIER, Computers & Mathematics with Applications, Volume 63, Issue 4, February 2012, Pages 775-782. <http://dx.doi.org/10.1016/j.camwa.2011.11.042> (<http://www.sciencedirect.com/science/article/pii/S089812211101025X>)
- 15- M. El-Beltagy, Magdy. A. El-Tawil, “Toward a Solution of a Class of Non-Linear Stochastic perturbed PDEs using Automated WHEP Algorithm”, Appl. Math. Modelling, Volume 37, Issues 12–13, Pages 7174–7192 (2013), doi: <http://dx.doi.org/10.1016/j.apm.2013.01.038> (<http://www.sciencedirect.com/science/article/pii/S0307904X13000905>)
- 16- M. El-Beltagy and A. Al-Johany, "Numerical Approximation of Higher-Order Solutions of the Quadratic Nonlinear Stochastic Oscillatory Equation Using WHEP Technique", Journal of Applied Mathematics, Vol. 2013, ID: 685137. (<http://www.hindawi.com/journals/jam/2013/685137/>)

- 17- M. El-Beltagy and M. Wafa, "Stochastic 2D Incompressible Navier-Stokes Solver Using the Vorticity-Streamfunction Formulation", Journal of Applied Mathematics, Vol. 2013, ID: 903618. (<http://www.hindawi.com/journals/jam/2013/903618/>)
- 18- M. El-Beltagy, M. Wafa and O. Galal, "Upwind Finite-Volume Solution of Stochastic Burgers' Equation", Applied Mathematics, Vol. 3 No. 11, pp. 1818-1825. doi: 10.4236/am.2012.311247 (<http://www.scirp.org/journal/PaperInformation.aspx?paperID=24759>) (2012).
- 19- M El-Beltagy and A. Al-Johani, "Higher-Order WHEP Solutions of Quadratic Nonlinear Stochastic Oscillatory Equation" Vol. 5 No. 5A, May 2013, pp. 57-69. doi: 10.4236/eng.2013.55A009 (<http://www.scirp.org/journal/eng>)
- 20- M. El-Beltagy and A. Al-Johani, "Stochastic Response of Duffing Oscillator with Fractional or Variable-Order Damping", Journal of Fractional Calculus and Applications, Vol. 4(2), July 2013, pp. 357-366.
- 21- S. Grace, M. El-Beltagy, S. Deif, "Asymptotic Behavior of Non-oscillatory Solutions of Second order Integro-Dynamic Equations on Time Scales", J Appl Computat Math 2 (134), 2, (2013).
- 22- A. Fareed, H. El-Zoheiry, M. El-Tawil, M. El-Beltagy, H. Hassan, "Solving Nonlinear Stochastic Diffusion Models with Nonlinear Losses Using the Homotopy Analysis Method", Applied Mathematics 5 (1), 115-127 (2014).
- 23- M. Hamed, M. El-Tawil, B. El-Desouky, M. El-Beltagy, "Solution of Nonlinear Stochastic Langevin's Equation Using WHEP, Pickard and HPM Methods", Applied Mathematics, 5 (3), 398-412 (2014).
- 24- M. Al-Nory and M. El-Beltagy, "An energy management approach for renewable energy integration with power generation and water desalination", Renewable Energy, vol. 72, issue C, pages 377-385 (2014).
- 25- M. A. El-Beltagy and N. A. Al-Mulla, "Solution of the Stochastic Heat Equation with Non-Linear Losses Using Wiener-Hermite Expansion", Journal of Applied Mathematics, Volume 2014, Article ID 843714, (2014).
- 26- Said R. Grace and Mohamed A. El-Beltagy "Oscillatory Behavior of Solutions of Certain Integrodynamic Equations of Second Order on Time Scales" Abstract and Applied Analysis, Volume 2014 (2014), Article ID 259467.

- 27- M. A. El-Beltagy and N. A. Al-Mulla "Solution of the Stochastic Heat Equation with Nonlinear Losses Using Wiener-Hermite Expansion", Journal of Applied Mathematics, Volume 2014 (2014), Article ID 843714.
- 28- O. A. Kittaneh & M. A. El-Beltagy "Efficiency estimation of type-I censored sample from the Weibull distribution based on sup-entropy", Communications in Statistics - Simulation and Computation, Taylor & Francis - pages 0361-0918 (2015) <http://dx.doi.org/10.1080/03610918.2015.1056355>
- 29- S. R. Grace and M. A. El-Beltagy^{1,2} "Oscillation Criteria for Some Higher Order Integrodynamic Equations on Timescales", Abstract and Applied Analysis, Volume 2015 (2015), Article ID 160240.
- 30- Ahmed M. A. Sattar and Mohamed El-Beltagy, "Stochastic Solution to the Water Hammer Equations Using Polynomial Chaos Expansion with Random Boundary and Initial Conditions" , Journal of Hydraulic Engineering, Vol. 143 (2), (2017). (DOI: [10.1061/\(ASCE\)HY.1943-7900.0001227](https://doi.org/10.1061/(ASCE)HY.1943-7900.0001227))
- 31- W.K. Zahra, M.A. El-Beltagy, A.M. El Mhlawy, and R.R. Elkhadrawy, Exponential Spline Solution for Singularly Perturbed Boundary Value Problems with an Uncertain—But—Bounded Parameter. Journal of Applied Mathematics and Physics (JAMP), Vol.6 No.4, pp. 854-863. (2018) (DOI: [10.4236/jamp.2018.64073](https://doi.org/10.4236/jamp.2018.64073))
- 32- M. Hamed, I. L. El-Kalla, B. S. El-desouky, M. A. El-Beltagy, Numerical Treatment of the Stochastic Advection-Diffusion Equation Using the Spectral Stochastic Techniques, International Journal of Engineering Research & Science (IJOER), Vol. 4 (6), pp. 1-17. (2018) (DOI: [10.5281/zenodo.1302309](https://doi.org/10.5281/zenodo.1302309)).
- 33- M. El-Beltagy and A. Noor, Analysis of the Stochastic Point Reactor using Wiener-Hermite Expansion, Annals of Nuclear Energy, Vol. 134, pp. 250-257. (2019) (DOI: [10.1016/j.anucene.2019.06.022](https://doi.org/10.1016/j.anucene.2019.06.022))
- 34- M. El-Beltagy, A Practical Comparison Between the Spectral Techniques in Solving the SDEs, Engineering Computations, Vol. 36 No. 7, pp. 2369-2402. (2019). (DOI: [10.1108/EC-10-2018-0444](https://doi.org/10.1108/EC-10-2018-0444))
- 35- M Hamed, IL El-Kalla, MA El-Beltagy, BS El-desouky, Solution of Stochastic Van der Pol Equation Using Spectral Decomposition Techniques, Applied Mathematics 11 (03), 184. (2020).

- 36- S. Alaskary and M. El-Beltagy, Uncertainty Quantification Spectral Technique for the Stochastic Point Reactor with Random Parameters, *Energies* 2020, 13(6), 1297; <https://doi.org/10.3390/en13061297>
- 37- S. Nagy, M. El-Beltagy, and M. Wafa, Multilevel Monte Carlo by using the Halton sequence, *Monte Carlo Methods and Applications* (published online ahead of print). (2020), doi: <https://doi.org/10.1515/mcma-2020-2065>
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Advising/Supervision: Main and co-supervisor for many PhD and MSc students in Cairo university and many other universities in Egypt.

Research Projects:

- Currently involved in research projects with Tabuk University, Tabuk, KSA.
- Currently involved in 2 research projects with team from King Abdulaziz University, Jeddah, KSA.
- Currently involved in a research in Mathematics and Grid generation, ASI company, North Carolina, USA.

Contact Persons:

Professor: Mohamed Mousa

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<https://www.effatuniversity.edu.sa/English/Personal/momousa/Pages/Default.aspx>

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Cover Letter

Dear Colleagues

I'm M. El-Beltagy; professor of Mathematics at Cairo University, Engineering Faculty; Department of Engineering Mathematics and Physics. I have a teaching experience of 22 years teaching and research in areas and applications related to Mathematics.

The teaching experience include many courses in calculus, differential equations, linear algebra, probability and statistics. Also, many post-graduate courses are within my experience including numerical analysis and the stochastic processes. I have got a long teaching experience in Egypt and Saudi-Arabi using the modern SMART techniques and solutions such as Blackboard and Moodle.

I'm currently active in research areas of applied mathematics with recently papers published in highly ranked journals. I'm involved in research projects in Egypt and Saudi-Arabia. Recent research directions include nuclear energy and the renewable energy along with many other applications.

I have a good experience in teaching post-graduate students and supervising MSc and PhD students. Currently I'm a supervisor and co-supervisor for around 15 post-graduate students.

Also, I have good ideas to service my society and teaching the people how to get benefit from the science and research to promote and sustain the resources.

Regards

Mohamed El-Beltagy

Teaching, Research and Service Philosophy

The teaching experience of Dr. El-Beltagy along 22 years is based on communicating and delivering the latest techniques used in the area of applied mathematics to the students. The theory behind the techniques should be transferred to the students along with the applications in different fields. The students should gain the total hours described in the course file in lectures and tutorials. Follow-up the Tas and contributing in the classroom tutorial sessions is mandatory to assure the delivered ILOs.

The research activities and directions should reflect the community requirements. Modeling of engineering systems specially those involved with stochastic and/or random variations gain a lot of my research. The current research activities of Dr. El-Beltagy are toward the modeling of stochastic processes presented in partial differential equations. Dr. El-Beltagy has recent publications at which the applied mathematics techniques are used to solve issues related to fluid mechanics, turbulence, population dynamics, renewable and nuclear energy.

The community service and teaching the whole society the knowledge required to keep the resources and the environmental conditions required for sustainable healthy life are of the main objectives. There should be a clear link and continuous communications with the society and the different authorities. Dr. El-Beltagy is active in communicating and teaching to the whole system.

Regards

Mohamed El-Beltagy