

CURRICULUM VITAE

Abdul Qayyum Masud Khaliq (A. Q. M. Khaliq)
 Department of Mathematical Sciences
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Naturalized Citizenship : USA

EDUCATION:

Ph. D. Mathematics	1983, Brunel University London, U.K
M. Sc. Numerical Analysis	1980, Brunel University London, U.K
M. Sc. Mathematics	1977, Quaid-i-Azam University, Islamabad, Pakistan

MEMBERSHIP OF SOCIETIES: Society of Industrial and Applied Mathematics (SIAM)

ACADEMIC POSITIONS:

08/2005 – Present (Tenured)	Professor Department of Mathematical Sciences Middle Tennessee State University Murfreesboro, TN 37132, USA
08/2004 – 05/2005	Professor Department of Mathematics University of Wisconsin- La Crosse La Crosse, WI 54601, USA
08/2003 – 08/2004	Professor Department of Mathematics, Knox College, Galesburg, IL 61401, USA
08/1994 – 08/2003	Professor Department of Mathematics Western Illinois University, Macomb, IL 61455, USA
08/1989 – 06/1994 (Tenure granted 1993)	Associate Professor Department of Mathematics Western Illinois University,

Macomb, IL 61455, USA

02/1989 – 08/1989 Associate Professor
Department of Mathematics
University of Bahrain, Bahrain

09/1983 – 01/1989 Assistant Professor
Department of Mathematics
University of Bahrain, Bahrain

Summer Visiting Positions:

06/2001 – 08/2001 Visiting Professor
Department of Mathematics
University of Wisconsin- Milwaukee
Milwaukee, WI, USA

07/1988 – 09/1988 Visiting Assistant Professor, Dept. of Mathematics

07/1987 – 09/1987 University of California, Los Angeles, CA, USA

EDITORIAL POSITIONS:

- Editor-in-Chief, International Journal of Computer Mathematics
- Associate Editor, Journal of Computational and Applied Mathematics
- Associate Editor, Punjab University Journal, Pakistan.
- Member Editorial Board, Numerical Methods for Partial Differential Equations
- Member Editorial Board, Journal of Computational Methods in Science and Engineering

HONORS AND AWARDS:

- Distinguished Research Award, Middle Tennessee State University, 2016.
- Excellence in Professional Service, College of Basic and Applied Sciences, Middle Tennessee State University, 2011
- Distinguished Research Award, Middle Tennessee State University, 2008.
- Overall Excellence Award, College of Basic and Applied Sciences, Middle Tennessee State University, TN, 2007.
- Excellence in Professional Service, College of Basic and Applied Sciences, Middle Tennessee State University, TN, 2007.
- Faculty Excellence Award in Research, College of Arts and Sciences, Western Illinois University, IL, 2002.

RESEARCH/ CREATIVE ACTIVITIES:

1. POST DOCTORAL RESEARCH POSITIONS

June 3, 2002-July 04, 2002,	Visiting Research Scientist Engineering Research Center Mississippi State University, MS
August 2, 1993-August 20, 1993,	Visiting Scientist ICASE, NASA, Langley, VA
August 5, 1990-August 15, 1990, Nov. 16, 1989-Nov. 23, 1989,	Research Fellow Super computation Research Institute Florida State Univ. Tallahassee, FL
July 23, 1990-July 30, 11990,	Research Fellow Department of Mathematics University of Maryland, College Park, MD
June 27, 1986-September 1, 1986, June 26, 1985-September 1, 1985,	Visiting Research Fellow Department of Mathematics Brunel Univ. England

2. RESEARCH SUPERVISION

Doctoral Dissertations at MTSU:

- Jie Long, Deep learning Algorithms for multidimensional partial differential equations in ecology, expected graduation, May 2025.
- Thomas Torku, Deep Neural Networks for Mathematical Models of Infection diseases, expected graduation, May 2024
- K. D. Olumoyin, *Data-Driven Deep Learning Algorithms for Bio-Chemical and Epidemiology Models*, May 2022.
- A.P. Harris, *Fractional Calculus in Population Dynamics*, Dec. 2021.
- T.A. Biala, *Numerical Algorithms for Fractional Partial Differential Equations with time-dependent boundary conditions*, May 2021.
- S.S. Alzharani, *Numerical approximations for the fractional Laplacian in space-fractional reaction-diffusion equations*, May 2020.
- H. J. Lay, *Stochastic Simulation using Multiple GPUs*, Dec. 2020.
- V. Reshniak, *Acceleration of the Multilevel Monte Carlo method for certain classes of differential systems*, May 2017.
- Z. Colgin, *Simulation of Stochastic System with MLMC*, August 2016.
- H.P. Bhatt, *Efficient and accurate exponential time differencing schemes for systems of nonlinear time dependent partial differential equations*, August 2016.
- X. Liang, *Efficient Numeircal Methods for Non-linear Schrodinger equations*, December 2015.

Ph.D. Students supervised jointly:

- Ibrahim Sarumi, co-advisor (jointly with Prof. Khleed Furati, KFUPM, Saudi Arabia); *Generalized Exponential Time Differencing Methods for Fractional Reaction -diffusion equations*, March ,2021.
- B. Janssen-Kleefeld; co-advisor, (jointly with Professor Bruce Wade, University of Wisconsin- Milwaukee, USA); *An Efficient Exponential Time Differencing Method for Nonlinear Reaction Diffusion Problems*, December 2009.

- M. Yousuf; co-advisor (jointly with Professor Bruce Wade, University of Wisconsin-Milwaukee, USA): *Higher Order Smoothing Schemes for Parabolic equations with applications to Option Pricing*, December 2004.
- M. Siddique; co-advisor (jointly with Professor Bruce Wade, University of Wisconsin-Milwaukee, USA), the thesis topic: *Smoothing with Positive preserving schemes for parabolic Equations*, December 2002
- M. Bashir; supervised on the topic, *Numerical Modeling of Tidal Flows in the Arabian Gulf*. The student was registered as an external student at Brunel University, England, while working full time at University of Bahrain, 1986-1993.

M.S Theses:

Middle Tennessee State University

- Ziren Chen, *Piecewise SEIUR model for the spread of COVID-19*, May 2021.
- Lin Feng, *SEIR model combined with LSTM and GRU for the trend analysis of COVID-19*, May 2021.
- Nana Boating, *Meshfree Methods for Black-Scholes PDE*, June 2012
- Richard Ewool, *Stochastic Models in Chemical Systems*, June 2011
- Wedge Fernando, *PDE and Monte Carlo Approaches for pricing Asian options*, May 2011

Western Illinois University

- Kamran **Kazmi**, *Numerical Methods for Option Pricing Models*, May 2002.
- Tuanjie Tong, *Explicit- Implicit Methods for Reaction-Diffusion Systems*, April 2002.
- Gilbert Shanga, *Locally One-Dimensional Methods for Parabolic Partial Differential Equations*, October 1998.
- Bader Abukhodair, *A Predictor-corrector Scheme for the sine-Gordon Equations*, May 1998
- Shahan Ahmed, *A Numerical Study of Reaction-Diffusion Equations*, May 1998
- Jianlin Cheng, *Numerical Methods for Reaction Diffusion Equations: Finite Difference and Finite Element Approaches*, May 1992.
- Yun Duck Kim, *Finite Element Solution of Parabolic Equations with Non- Smooth Data*, July 1991.
- Xiaoli Zhao, *Finite Element Methods for One Dimensional Fourth Order Time - dependent Partial Differential Equations*, July 1991.
- P. A. Mulconrey, *Multiderivative Methods for Hyperbolic PDEs*, May 1990.

Undergraduate Research Supervision:

- Houcheng Wu, *Regime switching Models in Insurance Risk*, Fall 2016
- Zhang Chen, *Risk and Insurance*, Fall 2016
- Robert Greenwood, *Statistical Analysis of Modern Risk Theory*, STEP grant 2006.
- Jason Wix, *Computational Study of Equity Models*, STEP grant, 2006.
- David Putnam, *Parallel Binomial methods for American option*, May 2004.
- Will J. Middlecamp, *Convergence analysis of Binomial and Trinomial models for European options*, May 2004.
- Salina Baafi, *Cox Robison option pricing model with Excel*, May 2004.

- Lauren Morris, *Cubic Spline Interpolation with JAVA*, May 1998.
- Wai-Tang Lee, *Splitting Methods for Multidimensional Parabolic Partial Differential Equations*, Dec. 1990 (Presented at the Annual Argonne Symposium for Undergraduates, Argonne National Lab, Argonne, IL)

3. RESEARCH INTEREST

Numerical Methods for Partial Differential Equations:

- Solving PDEs with deep learning
- PINN-Deep O Net for PDEs
- Fractional partial dimensional equations
- High order Implicit Time-stepping methods
- Efficient numerical methods for high dimensional PDEs.
- Local Discontinuous Galerkin Method for Time Dependent PDEs
- Adaptive methods
- Mesh free approximation using Radial Bases Functions
- Numerical Methods for Stochastic PDEs.
- Numerical methods for Multi scale Partial Differential Equations

Current Application Areas of Research:

- **Computational PDEs**
Non-linear Schrödinger equations with applications to fiber optics,
Fractional Non-linear Schrödinger equations,
Multidimensional fractional reaction-diffusion Systems
Space distributed fractional models
Computational Models in porous media
- **Mathematical and Scientific Machine Learning:**
Learning/Solving PDEs with deep learning
Data driven deep learning models
- **Computational Stochastic Analysis:**
Numerical Methods for Stiff Stochastic Differential Equations with applications in Chemical kinetics.
- **Computational Finance:**
Partial Differential Equation approach for high dimensional Option Pricing models,
Stochastic Volatility and Stochastic Interest Rate Models, Transaction Cost,
Regime switching with jumps, High Performance Computing in finance.
Multilevel Monte Carlo Methods.
- **Computational Epidemiology:**
Data driven models in Epidemiology
Data Analytics with Machine Learning
LSTM/GRU in time series forecasting of infection rates

4. PUBLICATIONS:

Guest Editor of Journal Special Issues:

- *Advances in Computational Fractional PDEs*, (with K.M. Furati, Ch. Li, and M. Zayernouri), International Journal of Computer Mathematics, Vol. **95** (6-7), 2018.
- *Recent Advances on the Numerical Methods for Systems of PDEs*, (with Q. Sheng and J. Ku) Journal of Computational and Applied Mathematics, Vol. **299**, 2016
- *Financial Derivatives*, (with Q.Sheng, and D.A.Voss) International Journal of Computer Mathematics, Vol. **86**(6), 2009
- *Numerical PDE Methods in Finance*, (with D. A. Voss), Journal of Computational and Applied Mathematics, Vol. **222**(1), 2008.
- *Splitting Methods for Differential Equations*, (with Q. Sheng), International Journal of Computer Mathematics, Vol. **84**(6), 2007.

Papers Published in refereed journals:

114. S. Hansun, F.P. Putri, A.Q.M. Khaliq, H. Hugeng, *on searching the best mode for forex forecasting: bidirectional long short-term memory default mode is not enough*, IAES International Journal of Artificial Intelligence, **11**(4), 1596-1606. 2022
113. Seng Hansun, Arya Wickson and Abdul Q. M. Khaliq, *Multivariate cryptocurrency prediction: comparative analysis of three recurrent neural networks approaches*, Journal of Big Data 9:50, 2022, <https://doi.org/10.1186/s40537-022-00601-7>
112. Lin Feng, Ziren Chen, Harold A. Lay, Jr., Khaled Furati, and Abdul Khaliq, *Data driven time-varying SEIR-LSTM/GRU algorithms to track the spread of COVID-19*, Mathematical Bio Sciences and Engineering, **19**(9), 8935–8962, 2022.
111. Ibrahim O. Sarumi, Khaled M. Furati, Kassem Mustapha, Abdul Q. M. Khaliq, *Efficient high-order exponential time differencing methods for nonlinear fractional differential models*, Numerical Algorithms, 2022, <https://doi.org/10.1007/s11075-022-01339-2>
110. Ziren Chen, Lin Feng, Harold A. Lay Jr., Khaled Furati, Abdul Khaliq, *SEIR model with unreported infected population and dynamic parameters for the spread of COVID-19*, Mathematics and Computers in Simulation, **198**, 31-46, 2022.
109. T. A. Biala, Y.O. Afolabi, A.Q.M. Khaliq, *How efficient is contact tracing in mitigating the spread of COVID-19? A mathematical modeling approach*, Applied Mathematical Modelling, **103**, 714-730, 2022.
108. Thomas K. Torku, Abdul Q. M. Khaliq, Khaled M. Furati, *Deep-Data-Driven Neural Networks for COVID-19 Vaccine Efficacy*, *Epidemiologia*, **2**(4), 564–586, 2021.
107. K. D. Olumoyin, A. Q. M. Khaliq, K. M. Furati, *Data-Driven Deep-Learning Algorithm for Asymptomatic COVID-19 Model with Varying Mitigation Measures and Transmission Rate*, *Epidemiologia*, **2**(4), 471-489, 2021.
106. Jie Long, A. Q. M. Khaliq, K. M. Furati, *Identification and prediction of time-varying parameters of COVID-19 model: a data-driven deep learning approach*, International Journal of Computer Mathematics, **98**(8), 1617-1632, 2021.

105. T.A. Biala, A.Q.M. Khaliq, *A fractional-order compartmental model for the Spread of the COVID-19 pandemic*, Communications in Nonlinear Science and Numerical Simulation, **98**, 105764, 2021.
104. K.M. Furati, I.O. Sarumi, A.Q.M. Khaliq, *Fractional model for the spread of COVID-19 subject to government intervention and public perception*, Applied Mathematical Modelling **95**,89-105 2021.
103. Ibrahim O. Sarumi, Khaled M. Furati, Abdul Q. M. Khaliq, Kassem Mustapha, *Generalized Exponential Time Differencing Schemes for Stiff Fractional Systems with Non-smooth Source Term*, Journal of Scientific Computing **86**:23, 2021.
102. Caiyu Jiao, Abdul Khaliq, Changpin Li, Hexing Wang, *Difference between Riesz derivative and fractional Laplacian on the proper subset of \mathbb{R}* , Fractional Calculus and Applied Analysis, **24**(6), 1716-1734, 2021.
101. T. A. Biala, A. Q. M Khaliq, *Predictor-corrector schemes for nonlinear space-fractional parabolic PDEs with time-dependent boundary conditions*, Applied Numerical Mathematics, **160**, 1-22. 2021.
100. Muhammad Yousuf and Abdul Q. M. Khaliq, *Partial differential integral equation model for pricing American option under multi state regime switching with jumps*, Numerical Methods for Partial Differential Equations, (2021) <https://doi.org/10.1002/num.22791>
99. Stefania Tomasiello, Vincenzo Loia, Abdul Khaliq, *A granular recurrent neural network for multiple time series prediction*, Neural Computing and Applications, **33**:10293–10310, 2021.
98. M.Yousuf, K.M. Furati A.Q.M. Khaliq, *High-order time-stepping methods for two-dimensional Riesz fractional nonlinear reaction–diffusion equations*, Computers & Mathematics with Applications, **80**(1), 204-226, 2020.
97. Ibrahim O. Sarumi, Khaled M. Furati, and Abdul Q. M. Khaliq, *Highly Accurate Global Padé Approximations of Generalized Mittag–Leffler Function and Its Inverse*, Journal of Scientific Computing 82:46, 2020.
96. K. Kazmi and A. Q.M. Khaliq, *An efficient split-step method for distributed-order space-fractional reaction-diffusion equations with time-dependent boundary conditions*, Applied Numerical Mathematics, **147**, 142-160, 2020.
95. H.P. Bhatt, A.Q. M. Khaliq, and K.M. Furati, *Efficient high-order compact exponential time differencing method for space-fractional reaction-diffusion systems with nonhomogeneous boundary conditions*, Numerical Algorithms **83**,1373–1397, 2020
94. K. Kazmi and A. Khaliq, *A Split-Step Predictor–Corrector Method for Space-Fractional Reaction–Diffusion Equations with Nonhomogeneous Boundary Conditions*, Communications on Applied Mathematics and Computation, **1** (4):525–544, 2019
93. V. Reshniak, A. Khaliq and D. Voss, *Slow-scale split-step tau-leap method for stiff stochastic chemical systems*, Journal of Computational and Applied Mathematics, **361**, 79–96, 2019.
92. A.G. Bratsos and A.Q.M. Khaliq, *An exponential time differencing method of lines for Burgers-Fisher and Coupled-Burgers equations*, Journal of Computational and Applied Mathematics, **356** (15),182-197, 2019.
91. S.S. Alzahrani, A. Q. M. Khaliq, T. Biala, and K.M. Furati, *Fourth-order time stepping methods with matrix transfer technique for space-fractional reaction-diffusion equations*, Applied Numerical Mathematics, **146**, 123-144, 2019.

90. S.S. Alzahrani and A.Q.M. Khaliq, *Fourier spectral exponential time differencing methods for multi-dimensional space-fractional reaction–diffusion equations*, Journal of Computational and Applied Mathematics, **361**, 157-175, 2019.
89. S.S. Alzahrani, and A.Q.M. Khaliq, *High-order time stepping Fourier spectral method for multi-dimensional space-fractional reaction–diffusion equations*, Computers and Mathematics with Applications, **77(3)**, 615-630, 2019.
88. T.A. Biala and A.Q.M. Khaliq, *Parallel algorithms for nonlinear time–space fractional parabolic PDEs*, Journal of Computational Physics, **375**, 135–154, 2018.
87. H.P. Bhatt A.Q.M. Khaliq, and B.A. Wade, *Efficient Krylov-based exponential time differencing method in application to 3D advection-diffusion-reaction systems*, Applied Mathematics and Computation, **338**, 260–273, 2018.
86. X. Liang, and A.Q.M. Khaliq, *An efficient Fourier spectral exponential time differencing method for the space-fractional nonlinear Schrödinger equations*, Computers and Mathematics with Applications, **75**, 4438–4457, 2018.
85. A. Bratsos and A Q. M. Khaliq, *An exponential time differencing method of lines for the Burgers and the Modified Burgers equation*. Numerical Methods for Partial Differential Equations, **34**, 2024-2039, 2018.
84. A.Q.M. Khaliq, T.A. Biala, S.S. Alzahrani, and K.M. Furati, *linearly implicit predictor-corrector methods for space-fractional reaction-diffusion equations with non-smooth initial data*, Computers and Mathematics with Applications, **75(8)**, 2629-2657, 2018.
83. K.M. Furati, M. Yousuf, and A.Q.M. Khaliq, *Fourth order methods for space fractional reaction-diffusion equations with nonsmooth data*, International Journal of Computer Mathematics, **95(6-7)**, 1240-1256, 2018.
82. O.S. Iyiola, E.O. Asante-Asamani, K.M. Furati, A.Q. M. Khaliq, and B.A. Wade, *Efficient time discretization scheme for nonlinear space-fractional reaction diffusion equations*, International Journal of Computer Mathematics, **95(6-7)**, 1274-1291, 2018.
81. Harold A. Lay, Zane Colgin, Viktor Reshniak, Abdul Q. M. Khaliq, *On the implementation of multilevel Monte Carlo simulation of the stochastic volatility and interest rate model using multi-GPU clusters*, Monte Carlo Methods and Applications, **24(4)**, 309–321, 2018
80. G. Tour, N. Thakoor, A. Q. M. Khaliq, and D. Y. Tangman, *COS method for option pricing under a regime-switching model with time-changed Lévy processes*, Quantitative Finance, **18(4)**, 673–692, 2018.
79. M. Yousuf, A.Q.M. Khaliq, and S. Alrabeei, *solving complex PIDE systems for pricing American option under multi-state regime switching jump–diffusion model*, Computers and Mathematics with Applications, **75(8)**, 2989-3001, 2018
78. S. Arshad, J. Huang, A.Q.M. Khaliq, and Y. Tang, *Trapezoidal scheme for time–space fractional diffusion equation with Reisz derivative*, Journal of Computational Physics, **350(1)**, 1-15, 2017.
77. A.Q. M. Khaliq, X. Liang and K.M. Furati, *A fourth order Implicit-Explicit scheme for the space fractional coupled nonlinear Schrödinger equations*, Numerical Algorithms, **75(1)**, 147-172, 2017.
76. X. Liang, A. Q. M. Khaliq, H. Bhatt, and K. M. Furati, *The locally extrapolated exponential splitting scheme for multi-dimensional nonlinear space-fractional Schrödinger equations*, Numerical Algorithms, **76(4)**, 939-958, 2017.
75. I. Ahmad, S. Islam, and A Q M Khaliq, *Local RBF method for multi-dimensional partial*

- differential equations, *Computers and Mathematics with applications*, **72**(2), 292-324, 2017.
74. A. Bratsos and A. Q. M. Khaliq, *A conservative exponential time differencing method for non-linear schrödinger equation*, *International J Computer Mathematics*, **94**(2), 230-251, 2017.
73. H. P. Bhatt and A. Q. M. Khaliq, *A Fourth order compact scheme for reaction –diffusion systems with non-smooth data*, *Journal of Computational and Applied Mathematics*, **299**, 176-193, 2016
72. H. P. Bhatt and A. Q. M. Khaliq, *Numerical simulation of coupled Burger's equations with compact schemes*, *Computer Physics Communications*, **200**, 117-138, 2016
71. E.O.Asante-Asamani, A.Q. M. Khaliq, and B. A. Wade, *A Real Distinct Poles Exponential Time Differencing Scheme for Reaction-Diffusion Systems*, *Journal of Computational and Applied Mathematics*, **299**, 24-34, 2016.
70. M. Yousuf, A. Q. M. Khaliq and R. Liu, *Pricing American options under multi-state regime switching with an efficient L-stable method*, *International Journal of Computer Mathematics*, **92**(12), 2530-2550, 2015.
69. V. Reshniak, A. Q. M. Khaliq, D. A. Voss, and G. Zhang, *Split-step methods for multi-channel stiff stochastic*, *Applied Numerical Mathematics*, **89**, 1-23, 2015
68. D. Voss and A. Q. M. Khaliq, *Split–step Adams–Moulton Milstein methods for systems of stiff stochastic differential equations*, *International J. of Computer Mathematics*, **92**, 995-1011, 2015
67. H. P. Bhatt, and A.Q.M. Khaliq, *Locally extrapolated exponential time differencing LOD method for multi-dimensional reaction-diffusion systems*, *Journal of Computational and Applied Mathematics*, **285**, 256-278, 2015.
66. X. Liang, A.Q.M. Khaliq and Y. Xing, *Fourth order exponential time differencing method with local discontinuous Galerkin approximation for coupled nonlinear Schrödinger equations*, *Communications in Computational Physics*, **17**(2), 510- 541, 2015.
65. X. Liang, A.Q.M. Khaliq, and Q. Sheng, *Exponential time differencing Crank-Nicolson method with a quartic spline approximation for nonlinear Schrödinger equations*, *Applied Mathematics and Computation*, **235**, 235-252, 2014.
64. H. P. Bhatt and A. Q. M. Khaliq, *Higher order exponential time differencing scheme for system of nonlinear Schrödinger equations*, *Applied Mathematics and Computation*, **228**, 271-291, 2014.
63. J. Mart´in-Vaqueroa, A.Q.M. Khaliq, and B. Kleefeld, *Stabilized explicit Runge-Kutta method for multi-asset American options*, *Computers and Mathematics with Applications*, **67**(6), 1293–1308, 2014.
62. M. Yousuf, and A.Q.M. Khaliq, *An efficient ETD method for pricing American options under stochastic volatility with non-smooth payoffs*, *Numerical Methods for Partial Differential Equations*, **29**(6), 1864-1880, 2013.
61. A.Q.M. Khaliq, B. Kleefeld, and R.H. Liu, *Solving complex PDE systems for pricing American options under regime-switching by Efficient Exponential Time Differencing schemes*, *Numerical Methods for Partial Differential Equations*, **29**(1), 320–336, 2013.
60. Q. Sheng, and A. Q. M. Khaliq, *A revisit of the semi-adaptive method for singular degenerate reaction-diffusion equations*, *East Asian Journal on Applied Mathematics*, **2**(3), 185-203, 2012
59. M. Yousuf, A. Q. M. Khaliq, and B. Kleefeld, *The Numerical Approximation of Nonlinear Black-Scholes Model for Exotic Path-dependent American Options with Transaction Cost*, *International Journal of Computer Mathematics*, **89**(9), 1239-1254, 2012.
58. B. Kleefeld, A. Q. M. Khaliq, and B. Wade, *An ETD Crank-Nicolson Method for Reaction-Diffusion Systems*, *Numerical Methods for Partial Differential Eqs.*, **28**(4), 1309-1335, 2012.

57. W Liao and A. Q. M. Khaliq, *High order compact scheme for solving nonlinear Black-Scholes equation with transaction cost*, International J. of Computer Mathematics, **86**(6),1009-1023,2009.
56. A.Q.M. Khaliq and R.H. Liu, *New numerical scheme for pricing American Option with regime-switching*, International Journal of Theoretical and Applied Finance, **12** (3), 319-340, 2009.
55. A.Q.M. Khaliq, J. Martín-Vaquero, B. A. Wade, M. Yousuf, *Smoothing schemes for reaction-diffusion systems with non-smooth data*, J. Computational and Applied Mathematics, **223**, 374-386, 2009.
54. A.Q.M. Khaliq, D. A.Voss and G. E. Fasshauer, *A parallel time stepping approach using mesh free approximations for options with non-smooth payoffs*, J. of Risk, **10**(4), 135- 142, 2008.
53. A.Q.M. Khaliq, D.A. Voss, K. Kazmi, *Adaptive θ -methods for pricing American options*, Journal of Computational and Applied Mathematics, **222**(1), 210-227, 2008.
52. A.Q.M. Khaliq, D.A. Voss, M. Yousuf, *Pricing Exotic Options with L-Stable Padé Schemes*, Journal of Banking and Finance, **31**, 3438-3461, 2007.
51. B.A. Wade, A.Q.M. Khaliq, M. Yousuf, J. Vigo-Aguiar, R. Deininger, *On smoothing of the Crank–Nicolson scheme and higher order schemes for pricing barrier options*, Journal of Computational and Applied Mathematics, **204**, 144-158, 2007.
50. A.Q.M. Khaliq, B.A. Wade, M. Yousuf, J. Vigo-Aguiar, *High Order Smoothing Schemes for Inhomogeneous Parabolic Problems*, Numerical Methods for Partial Differential Equations, *An International Journal*, **23**, 1249-1276, 2007
49. A. Q. M. Khaliq, and Q. Sheng, *On the monotonicity of an adaptive splitting scheme for two-dimensional singular reaction-diffusion equations*, International Journal of Computer Mathematics, **84**(6), 795-806, 2007.
48. A.Q. M. Khaliq, D.A. Voss, and S.H.K. Kazmi, *A linearly implicit predictor corrector scheme for pricing American Options using a penalty method approach*, Journal of Banking and Finance, Vol. **30**, 489-502, 2006
47. W. Liao, J. Zhu, and A.Q.M. Khaliq, *A Fourth order compact algorithm for nonlinear Reaction-diffusion equations with Neumann boundary conditions*, Numerical Methods in Partial Differential Equations, *An International Journal*, **22**(3), 600-616, 2006
46. Q. Sheng, A.Q.M. Khaliq, and D.A. Voss, *Numerical Simulation of Two- Dimensional Sine-Gordon Solitons via a Split Cosine Scheme*, Mathematics and Computers in Simulation, **68**(4) 355-373, 2005.
45. B. Wade, A.Q. M. Khaliq, and M. Siddique, *smoothing with positivity preserving Padé schemes for parabolic problems*, Numerical Methods for Partial Differential Eqs., **21**(3), 553-573,2005.
44. G. Fasshauer, A.Q.M. Khaliq, and D.A. Voss, *Using Mesh free approximation for Multi Asset American Options*, Journal of Chinese Institute of Engineers (JCIE) , **27**(4), 563-571, 2004.
43. D.A.Voss, A.Q.M. Khaliq, S.H.K. Kazmi, and H.He, *A Fourth Order L-Stable method for the Black-Scholes model with barrier options*, (Eds. M.L. Gavrilova, V. Kumar, and C.J.K. Tan), Lecture Notes in Computer Science, Springer-Verlag Heidelberg, **2669**, ISSN: 0302- 9743, 199-207, 2003.
42. W. Liao, J. Zhu, and A.Q.M. Khaliq, *An Efficient High order Algorithm for Solving System of Reaction-Diffusion Equations*, Numerical Methods for PDEs, **18**(3), 340-354, 2002
41. Sheng and A.Q.M. Khaliq, *Modified arc-length adaptive algorithms for degenerate reaction-*

- diffusion equations*, Applied Mathematics and Computation **126**, 279-297, 2002
40. A.Q.M.Khaliq and B Wade, *On the Smoothing of Crank-Nicolson Method for Non homogenous Parabolic Partial Differential Equations*, Journal of Computational Methods for Sciences and Engineering, **1**(1), 17-30, 2001
 39. Q. Sheng, A. Q. M. Khaliq, and E. Al-Said, *Solving the generalized nonlinear Schrödinger equation via quartic spline approximations*, J. of Computational Physics, **166** (2), 400-417, 2001
 38. Q. Sheng and A.Q.M. Khaliq, *Adaptive methods for convection-diffusion-reaction Equations of quenching type*, Dynamics of Continuous, Discrete & Impulsive Sys., **8**, 129-148, 2001.
 37. A.Q.M. Khaliq and Q.Sheng, *Linearly Implicit Adaptive Schemes for Singular Reaction-Diffusion equations*, in *Adaptive Methods of Lines* (eds. Wouwer; Alain Vande, Saucez; Phillippe, Schiesser; William E) CRC Press, USA, ISBN/ISSN 158488231X, April 2001
 36. D.S. Daoud, A.Q.M.Khaliq, and B.Wade, *A Non-overlapping Implicit Predictor-Corrector Scheme for Parabolic Equations*, Proceedings of the International Conference on Parallel and Distributed Processing: Techniques and Applications (DPTA'2000), ed. H.R. Arabnia, Vol. **I**, pp.15-19, 2000, CSREA Press, Las Vegas, Nevada, USA.
 35. D.A.Voss and A.Q.M.Khaliq, *Parallel Rosenbrock Methods for Chemical Systems*, Computers & Chemistry: **25**(1), 101-107, 2000.
 34. A.Q.M.Khaliq, B. Abukhoier, Q. Sheng, and M.S. Ismail, *A Predictor-corrector Scheme for the sine-Gordon Equation*, Numerical Methods for Partial Differential Equations: An International Journal, **16**(2), 133-146, 2000.
 33. D.A.Voss and A.Q.M.Khaliq, *A Linearly Implicit Predictor-Corrector Method for the Reaction-Diffusion Equations*, Computers & Mathematics with Applications, **38**(11-12), 207-216, 1999.
 32. Q. Sheng and A.Q.M.Khaliq, *A Compound Adaptive Approach to Degenerate Nonlinear Quenching Problems*, Numerical methods for Partial Differential Equations: **15**, 29-47, 1999.
 31. D.A.Voss and A.Q.M. Khaliq, *Time-Stepping Algorithm for Parabolic PDEs Based on Rational Approximants with Distinct Poles*, Advances in Computational Mathematics, **7**, 353-363, 1997.
 30. A.Q.M. Khaliq and D.A.Voss, *A Predictor Corrector Scheme for Reaction Diffusion Equations*, ZAMM, 577 – 578, **76**(S1), 1996
 29. D.A.Voss and A.Q.M. Khaliq, *Parallel LOD Methods for Multidimensional PDEs*, Computers & Math. with Applications, **30**(10), 25-35, 1995.
 28. A. Q. M. Khaliq, E. H. Twizell, and D. A. Voss “*On Parallel Algorithms for Semi discretized Parabolic Partial Differential Equations Based on Sub diagonal Pade Approximations*”, Numerical Methods for Partial Differential Equations, **9**(2), 107-116, 1993.
 27. A. Q. M. Khaliq and D. A. Voss, *A parallel Fourth Order Method for Second Order Hyperbolic PDEs*, in R. F. Sincovec (ed), Proceedings of the sixth SIAM Conference on “Parallel Processing for Scientific Computing”, 586-589, 1993.
 26. E.H.Twizell, A.Q.M. Khaliq and D.A.Voss, *Sequential and Parallel Algorithms for Second Order Initial Value Problems*, in CONTRIBUTIONS IN NUMERICAL MATHEMATICS (R.P. Agarwal, Ed), [World Scientific Series in Applicable Analysis, Vol. **2**], World Scientific, Singapore, 399-412, 1993.
 25. D.A.Voss and A.Q.M. Khaliq, *A Parallel Splitting Method For Second Order Multidimensional Hyperbolic Partial Differential Equations*, in R. Vichnevsky, D. Knight and G. Ritcher (Eds.), “Advances in Computer Methods for Partial Differential Equations” VII, 411-417, 1992.
 24. E.H. Twizell, S.A. Matar, D.A. Voss and A.Q.M. Khaliq, *Explicit Numerical Methods With*

- Enhanced Stability Properties For First -Order Autonomous Initial-Value Problems, International J of Eng. Science, 30(3), 379-392, 1992.*
23. A.Q.M. Khaliq, E.H. Twizell, and A.Y. Al-Hawaj, *Dynamic Analysis of Cantilever Beam by Finite Element Method*, In MAFLAP 90 (J.R. Whiteman, ed), Academic Press, 471-478, 1991
 22. M. Bashir, A.Q.M. Khaliq, A.Y. Al-Hawaj and E.H. Twizell, *An Explicit Difference Model for Tidal Flows in the Arabian Gulf*, in W.L. Hogarth and B.J. Noye (eds.), Proceedings of the International Conference on “Computational Techniques and Applications”, Australia: CTAC-89, Hemisphere Publishing Co., 295-302, 1990
 21. A.Q.M. Khaliq and E.H. Twizell, *Global Extrapolation of Numerical Methods for Initial Value Problems*, Applied Math. & Computation, **31**,148-169, 1989
 20. D.A.Voss and A.Q.M. Khaliq, *A Sixth Order Predictor-Corrector Methods for Periodic Initial Value Problems*, Applied Mathematics Letters, 2(1), 65-68, 1989.
 19. E.H. Twizell and A.Q.M. Khaliq, *A Family of Predictor-Corrector Methods for Second Order Hyperbolic Equations*, Communications in Applied Numerical Methods, **5**,47-51, 1989.
 18. A.Q.M. Khaliq and E.H. Twizell, *Global Extrapolation on Three and four Grids for Special Initial Value Problems*, Applied Mathematics Letter, **2**(1), 35-37,1989.
 17. A.Q.M. Khaliq, *A Predictor-Corrector Scheme for Fourth Order Parabolic Partial Differential Equations*, Computer and Mathematics with Applications, **17**(12), 1563-1566, 1989.
 16. A.Q.M. Khaliq and E.H. Twizell, *The Effect of Global Extrapolation on the Phase-Lag of Symmetric Methods for Solving Periodic Initial Value Problems*, International Journal of Computer Mathematics, **28**, 161-169, 1989.
 15. F. S. H. Al-Sadah, A. Q. M. Khaliq and M. Bashir, *Finite difference Analysis for Navier- Stokes and Energy Equations of Couette-Poiseuille Flow*, in J. Noye and C. Flethcher (eds.), CTAC-87, North Holland, 71-81, 1988.
 14. E. H. Twizell and A. Q. M. Khaliq, *Global extrapolation Methods for the Fourth Order Parabolic Partial Differential Equation*, Arabian Gulf J. of Sci. Research, **A6** (1), 1-15, 1988.
 13. A. Q. M. Khaliq and E. H. Twizell, *Methods with $O(h^4)$ and $O(h^6)$ phase lags for the periodic initial value problems*, International J of Computer Mathematics, **25**, 49-54,1988.
 12. A. Q. M. Khaliq and E. H. Twizell, *A family of second order methods for variable coefficient fourth order parabolic partial differential equations*, International Journal of Computer Mathematics, **23**, 63-76, 1987.
 11. A. Q. M. Khaliq and E. H. Twizell, *Lo-stable splitting methods for the simple heat equation in two space dimensions with homogenous boundary conditions*, SIAM Journal on Numerical Analysis, **23** (3), 473-484, 1986.
 10. A. Q. M. Khaliq and E. H. Twizell, *A Family of Numerical Methods for Diffusion and reaction-diffusion equations*, Numerical Methods for partial differential equations, **2**, 31-45, 1986.
 9. E. H. Twizell and A. Q. M. Khaliq, *Lo-stable methods for constant coefficient parabolic equations’ in Haqmoui (ed), proceedings of the conference on Mathematical analysis and its Applications*, Univ. of Kuwait, 349-358, 1985.
 8. E. H. Twizell and A. Q. M. Khaliq, *Reaction-diffusion equations in mathematical biology*, in J. C. Lion and B. N. Feinberg (eds), Proceedings of the Seventh Annual Conference of the IEEE/ENG. in Med. and Biol/ Soc; 1292-1295, IEEE, New York, 1985.
 7. A. Q. M. Khaliq and A. Y. Al-Hawaj, *A third order finite difference methods for two dimensional parabolic equations*, in Hamoui (ed.), proceedings of the conference of

- Mathematical analysis and its Applications, Univ. of Kuwait, 281-288, 1985.
6. A. Q. M. Khaliq and E. H. Twizell, *Stability regions for one step multi-derivative methods in PECE mode with applications to stiff system*, International J of Comp. Math., **17**, 323-338, 1985.
 5. E. H. Twizell and A. Q. M. Khaliq, *Multiderivative methods for periodic initial value problems*, SIAM Journal on Numerical Analysis, **21** (1), 111-122, 1984.
 4. A. Q. M. Khaliq and E. H. Twizell, *Backward difference replacements of the space derivative in first order hyperbolic equations*, Comp. Methods in Applied Mech. and Eng, **43** (1), 45-56, 1984.
 3. E. H. Twizell and A. Q. M. Khaliq, *A difference scheme with high accuracy in time for fourth order parabolic equations*, Computer Methods in Applied Mechanics, and Engineering, **41**, 91 – 104, 1983.
 2. A. Q. M. Khaliq and E. H. Twizell, *The extrapolation of stable finite difference schemes for first order hyperbolic equations*, International Journal of Computer Mathematics, **11**, 155-167, 1982
 1. E. H. Twizell and A. Q. M. Khaliq, *One-step Multiderivative methods for first order ordinary differential equations*, BIT, **21**(4), 518-527, 1981.

5. ***Ph.D. DISSERTATIONS EXTERNAL EXAMINER:***

- External Evaluator of a Ph.D. Dissertation, COMSAT Institute of Information Technology, Islamabad, Pakistan, 2021.
- External Evaluator of a Ph.D. Dissertation, Department of Mathematics, Ripha International University, Rawalpindi, Pakistan, 2020.
- External Evaluator of a Ph.D. Dissertation, Department of Mathematics, University of Sargodha, Pakistan, 2019.
- External Evaluator of a Ph.D. Dissertation, COMSAT Institute of Information Technology, Islamabad, Pakistan, 2018.
- External Evaluator of a Ph.D. Dissertation, Department of Mathematics, University of Peshawar, Peshawar, Pakistan, 2016.
- External Evaluator of a Ph.D. Dissertation, Department of Mathematics, University of Punjab, Lahore, Pakistan, 2015.
- External Evaluator of a Ph.D. Dissertation, Department of Mathematical Information Technology, University of Jyväskylä, Agora, Finland, 2013.
- External Evaluator of a Ph.D. Dissertation, COMSAT Institute of Information Technology, Islamabad, Pakistan, 2012.
- External Evaluator of a Ph.D. Dissertation, GIK Institute of Engineering, Science and Technology, Topi, Pakistan, 2011
- External Evaluator of a Ph.D. Dissertation, University of Mauritius, Mauritius, 2011
- External Evaluator of a Ph.D. Dissertation, GIK Institute of Engineering, Sciences and Technology, Pakistan, 2009.
- External Evaluator of a Ph.D. Dissertations, GIK Institute of Engineering, Sciences and Technology, Pakistan, 2005.
- External Examiner of 4 PhD students, Brunel University, England, 1994-2001

6. **PRESENTATIONS:**

Invited Colloquium Presentations:

- Department of Mathematics, COMSAT, Institute of Science and Technology, Islamabad, Pakistan. Feb. 04, 2020.
- Department of Mathematics, COMSAT, Institute of Science and Technology, Islamabad, Pakistan. August 13, 2018
- Department of Mathematics and Statistics, King Fahad University of Minerals and Petroleum (KFUPM), Dhahran, Saudi Arabia, Dec. 13, 2017.
- Department of Mathematics and Statistics, Austin Peay University, Clarksville, TN, September 10, 2015.
- Department of Mathematics and Statistics, King Fahad University of Minerals and Petroleum (KFUPM), Dhahran, Saudi Arabia, March 16, 2015.
- Department of Mathematics and Statistics, King Fahad University of Minerals and Petroleum (KFUPM), Dhahran, Saudi Arabia, May 16-18, 2011
- Department of Economics and Finance, King Fahad University of Minerals and Petroleum (KFUPM), Dhahran, Saudi Arabia, May 24, 2011.
- Department of Mathematics and Computer Science, Western Kentucky University, KY, Dec.03, 2010.
- Department of Mathematics, Florida State University, Tallahassee, FL, October 23, 2009.
- Department of Mathematics, University of Cologne (Universität zu Köln), Köln, Germany, August 27, 2009
- Department of Mathematics, COMSAT Institute of Information Technology, Islamabad, Pakistan, August 10-20, 2009.
- Department of Mathematics, UAE University, Al-Ain, UAE, May 16-23, 2009.
- Centre for Industrial and Applied Mathematics, Oxford University, England, March 21, 2007.
- Department of Mathematics, Illinois Institute of Technology, Chicago, IL, March 03, 2006.
- Department of Mathematics, University of Iowa, Iowa, USA, October 17, 2005.
- Department of Mathematical Sciences, University of Wisconsin-Milwaukee, WI, USA, March 05, 2004.

Invited Workshop Presentations:

- Workshop on Data driven models in Science and Engineering, King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia, December 13, 2019
- Workshop on Fractional Models in Science and Engineering, King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia, December 13, 2016.
- One Day International Workshop on Computational Mathematics with Applications, Shaheed Benazir Bhutto Women University, Peshawar, Pakistan, March 10, 2014.
- Workshop on Interdisciplinary Mathematics in Quantitative Finance and Risk, Riphah International University, Islamabad, Pakistan, March 3-7, 2014
- Workshop on Nonlinear Models and Computational Challenges in Mathematical Finance, Sukkur Institute of Business Administration, Sukkur, Pakistan, Feb. 24-25, 2014.
- Workshop on Modeling and simulation in Mathematical Finance, Air University, Islamabad, Pakistan, Nov. 24, 2013.
- Workshop on Computational Mathematics and Related Topics, COMSAT Institute of Information

Technology, Islamabad, Pakistan, June 23, 2008.

- Workshop on Quantitative Finance and Risk Management, Sukhar Institute of Business Administration, Sukhar, Pakistan, July 25-26, 2006.
- Workshop on Financial Mathematics, Lahore University of Management Sciences (LUMS), Lahore, Pakistan, Dec.24-25, 2005.
- International Workshop on Computational Mathematics, COMSATS Institute of Information Technology, Islamabad, Pakistan, July 28-30, 2002.

Conference Presentations:

	Name and Place of Conferences	Date	Presentation
54.	SIAM conference on Computational Science and Engineering, Spokane, WA, USA	Feb. 25-March 01 2019 (Mini Symp. Speaker)	Parallel methods for time-space fractional reaction diffusion equations.
53.	SIAM Annual Meeting David Lawrance Convention Center Pittsburgh, PA, USA	July 10-14, 2017 (Mini Symp. speaker)	Locally Extrapolated space fractional method for Semi-Linear PDEs
52.	SIAM Conference on Computational Science and Engineering, Atlanta, GA, USA	Feb.27, 2016- March 03 2017 (Mini Symp. Speaker)	Splitting Methods for Multi-dimensional Fractional Nonlinear Schrodinger Equations
51.	SIAM Conference on Financial Mathematics & Engineering Austin, TX, USA	Nov. 17-20, 2016 (Mini Symp. Speakers)	Pricing option under regime switching Jump Diffusion Models
50.	International Conference on Computational Finance Greenwich, London, UK	Dec. 14-18, 2015 (Keynote Speaker)	Option pricing with multi-state regime switching
49.	The Second International Conference on Mathematics and Statistics American University of Sharjah, UAE	April 2-5, 2015	Split- step Methods for Stiff SDEs
48.	SIAM Conference on Financial Mathematics and Engineering Chicago, IL, USA	Nov. 13-15, 2014 (Mini Symposium Speaker)	Regime Switching Models for American Option
47.	4 th International Conference on Business & Management Institute of Business Administration Sukkur, Pakistan	Feb. 26-27, 2014 (keynote speakers)	Nonlinear Models and Computational Challenges in Mathematical Finance
46.	International Conference on Modeling And Simulation, Air University Islamabad, Pakistan	Nov. 25-27, 2013 (keynote speaker)	Local Discontinuous Galerkin Method for system of Nonlinear Schrödinger Equations
45.	13 th Intenrational Conference On Computational and mathematical Methods in science and engineeirng (CMMSE), Al-Maria, Spain	June 24-27, 2013 (keynote speaker)	Non-linear Models and Numerical Simulation In Mathematical Finance

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| 44. | SIAM South-East Regional Conference
Oakridge National Laboratory, (Mini-symposium speaker)
Knoxville, TN, USA | March 23-24, 2013 | Locally Discontinuous Galerkin
Method for Nonlinear System
of Schrödinger Equations |
| 43. | SIAM conference on Computational
Science & Engineering
Westin Boston, MA, USA (Mini-symposium speaker) | Feb.25-March 01
2013 | Split-step Adam-Moulton
Milstein methods for Stiff
SDEs |
| 42. | 70th Midwest PDE Conference,
University of Memphis,
Memphis, TN, USA | Nov. 3-4, 2012
(Invited Speaker) | ETD Methods for Nonlinear
Schrödinger Equation |
| 41. | SIAM conference on Financial
Mathematics & Engineering (Mini-symposium speaker)
Hyatt Regency, MN, USA | July 9-11,2012 | ETD methods for American
options with transaction cost |
| 40. | SIAM Conference on Uncertainty
Quantification, Raleigh, NC | April, 2-5
2012 | A predictor-corrector method
for Stochastic ODEs |
| 39. | 4 th International Conference
On Mathematical Sciences
UAE University, Al-Ain, UAE | March, 11-14
2012
(Keynote speaker) | Nonlinear Models in
Mathematical Finance |
| 38. | PDEs and Mathematical Finance
Rutgers University
New Brunswick, NJ, USA | Nov. 4, 2011 | Pricing and Hedging Exotic
American options |
| 37. | SIAM Conference on
Computational Science
Science and Engineering
Reno, NV, USA | Feb.28-March 04
2011 | An ETD Crank-Nicolson
Method for Reaction-
Diffusion Systems |
| 36. | Conference on Numerical
Methods in Finance
École des Ponts ParisTech
Marne-la-Vallée, France | April 15-17, 2009 | New Numerical Scheme for
American option under
Regime switching |
| 35. | 6 th International Congress on
Industrial and Applied Mathematics
EHT, Zurich, Switzerland | July16-19, 2007 | Robust Numerical schemes
for pricing Exotic options |
| 34. | 7 th International Conference
(CMSE)Illinois Institute of Technology,
Chicago, IL, USA | June 20-23, 2007 | High order compact scheme
for Nonlinear Black-Scholes
Equation |
| 33. | SIAM Annual Meeting
Boston, Park Plaza hotel
Boston, MA, USA. | July10-14, 2006 | Linearly Implicit
Splitting Methods for
Reaction-Diffusion equation |
| 32. | SIAM conference on
Financial Mathematics
& Engineering, Boston, USA | July 9-12, 2006 | Smoothing Schemes
for Option Pricing |
| 31. | International Conference on
Numerical Methods for
Finance, Dublin, Ireland | June 7-9, 2006 | Pricing Exotic Options
with L-Stable Schemes |
| 30. | International Conference | April 06-08, 2005 | Numerical PDE |

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| | On Risk Management
and Quantitative Approaches in
Finance, Univ. of Florida, USA | | Approach for the
Valuation of Exotic Options |
| 29. | Third World Congress
Bachelier Finance Society
Chicago, IL, USA | July 21-24, 2004 | Valuation of American
Digital option: A
Mesh free Parallel approach |
| 28. | International Conference
on Modeling, Optimization
and Risk Management in Finance,
University of Florida, Gainesville,
FL, USA | March 05-07, 2003 | Valuation of
American Option
Via Penalty Method |
| 27. | IEEE: Multi Topic Conference
Lahore University of Management (Invited presentation)
Sciences (LUMS), Lahore, Pakistan | Dec. 28-30, 2001 | Numerical Computing
with IEEE Floating
Point Arithmetic |
| 26. | First SIAM Conference on
Computational Sciences and Engineering,
Washington, DC., USA | Sept. 21-24, 2000 | Parallel Rosenbrock
Methods for Chemical
Systems |
| 25. | Perspectives in Applied
Mathematics: In the Honor
of Gilbert Strang on his 65 th
Birthday, MIT, USA | Dec 3-4, 1999
(Invited Presentation) | Linearly Implicit
Strang Splitting for
Two-Dimensional
sine-Gordon Solitons |
| 24. | 4 th International Congress on
Industrial and Applied Mathematics
(ICIAM'99) Edinburgh, Scotland, U.K | July 5-9, 1999 | Parallel LOD Method
for the Reaction-
Diffusion Systems |
| 23. | IMACS International Conference
on Non linear Evolution Equations,
University of Georgia, USA | April 12-15, 1999 | Adaptive Methods of
Lines Scheme for
Reaction-Diffusion Equations |
| 22. | Recent Advances on Partial
Differential Equations
Iowa State University, USA | July 1-5, 1998 | Modified Arc Length
Adaptive method for
degenerate problems |
| 21. | Midwest NA Day
Western Illinois University, IL. | April 25, 1998 | Adaptive Methods for
Reaction-Diffusion Equations |
| 20. | Midwest NA Day
Iowa State University
Ames, Iowa, USA | April 12, 1997 | A Predictor Corrector scheme
for Reaction Diffusion
Equation |
| 19. | 11th International Conference,
Mathematical Modeling and
and Scientific Computing,
George Town University, USA | Mar 31-April 4
1997 | A Numerical Study
of Ginzburg-Landau
Equation |
| 18. | International Conference,
on Scientific Computations
Stanford University, USA | Mar. 28-April 1
1995 | Time Stepping
for PDEs |
| 17. | 14th IMACS World Congress | July 11-15, 1994 | Parallel Splitting |

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|-----|---|----------------------|---|
| | on Computational and Applied Mathematics, Georgia Institute of Technology, Atlanta, GA, USA | | Methods for PDEs |
| 16. | Eighth Conference
Mathematics of Finite Elements
And Applications,
Brunel University, England | April 27-30, 1993 | A parallel Semi
Discretized Galerkin
Splitting Method for
Hyperbolic Equations |
| 15. | Sixth SIAM Conference
Order on Parallel Processing
for Scientific Computing,
Norfolk, VA, USA | March 22-24, 1993 | A Parallel Fourth
Method for
Hyperbolic PDEs. |
| 14. | SIAM 40th Anniversary
Meeting, Century Plaza
Hotel, Los Angeles, CA, | July 20-24, 1992 | A Parallel Algorithm
for Second Order
Hyperbolic PDE |
| 13. | 7th IMACS International
Conference on Computer
Methods for Partial
Differential Equations,
Rutgers University, NJ | June 22-24, 1992 | A Parallel Splitting
Method for Multi-
dimensional
Hyperbolic PDEs |
| 12. | Parallel Circus
Oak Ridge Natl Lab, TN | Oct. 25-26, 1991 | A Parallel Method
For Parabolic PDEs |
| 11. | International
Congress, ICIAM' 91
Washington, D.C. USA | July 8-12, 1991 | Split Multi-Step
Methods for Reaction-
Diffusion Equations |
| 10. | The 14th Biennial
Conference on Numerical Anal
Dundee, Scotland, UK | June 25-29, 1991 | A Parallel L-Stable
Splitting Method for
Parabolic Equations |
| 9. | Fifth SIAM
Conference on Parallel Processing
For Scientific Computing
Houston, TX, USA | March 24-27, 1991 | Parallel Splitting
Methods for PDEs |
| 8. | SIAM National Meeting
Hyatt Regency Hotel
Chicago, IL, USA | July 16-20, 1990 | Parallel A-Stable
Method for Second
PDEs |
| 7. | Seventh Conference
On Mathematics of Finite Element
Brunel University, Uxbridge, UK | April 24-27, 1990 | Dynamic Analysis of
Cantilever Beam |
| 6. | SIAM National Meeting
Hyatt Regency Hotel
Minneapolis, MN, USA | July 11-15, 1988 | Two-Steps Obrechhoff
Methods for periodic
Initial Value Problems |
| 5. | International Conference
On Numerical Mathematics,
National University of Singapore | May 31-June 4, 1988 | A predictor-Corrector
Scheme for Fourth Order
Parabolic Equations |
| 4. | Sixth Conference on | April 28-May 1, 1987 | A Finite Element |

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| | Mathematics of Finite Elements
Brunel University, England | | Model of Water
Flow in the Arabian Gulf |
| 3. | International Congress
of Mathematicians,
University of California
Berkeley, CA, USA | August 3-11, 1986 | Splitting Methods for
Multi-dimensional
Parabolic Equations |
| 2. | 1986/ODE Conference
Sheraton Old Town Hotel
Albuquerque, NM, USA | July 26-Aug.1, 1986 | Global Extrapolation
Methods for Periodic
Initial Value Problems |
| 1. | SIAM National Meeting
Boston Park Plaza Hotel, USA | July 21-25, 1986 | L-Stable methods for PDEs |

7. PARTICIPATIONS IN SCIENTIFIC WORKSHOPS:

- Scientific Machine Learning, ICERM, Brown University, USA, Jan. 28-31, 2019.
- 75 years of Mathematics of Computation, ICERM, Brown University, USA, Nov.1-4, 2018.
- Fractional PDEs: Theory, and Applications, ICERM, Brown University, USA, Jun 18 - 22, 2018.
- IMA workshop on Theory and Application of Stochastic Partial Differential Equations, University of Minnesota, MN, January 14-18, 2013.
- Workshop on Uncertainty Quantification, ICERM, Brown University, RI, October 9-13, 2012
- IMA workshop on Computing with Uncertainty and Complex systems, Univ. of Minnesota, Minneapolis, MN, October 18-22, 2011.
- NSF/CBMS Regional Conference on the Recent Advances on the Numerical Approximation of Stochastic Partial Differential Equations and Their Applications, Illinois Institute of Technology, Chicago, IL, August 09-13, 2010
- Workshop on Stochastic Partial Differential Equations, Technical University Darmstadt, Germany, August 24-28, 2009
- IMA workshop on Mathematics of Proteins, Univ. of Minnesota, MN, Jan. 14-18, 2008
- Workshop on Financial Mathematics, Statistical and Applied Mathematical Sciences Institute (SAMSI), Research Triangle Park, NC, Feb. 27-28, 2006
- Workshop on Financial Mathematics, Statistical and Applied Mathematical Sciences Institute (SAMSI), Research Triangle Park, NC, September 18-21, 2005.
- IMA Workshop on Future Challenges in Multi scale Modeling and Simulation, University of Minnesota, MN, November 18-20, 2004.
- MCBMS Regional Conference on Stochastic Partial Differential Equations and Their Applications, Illinois Institute of Technology, Chicago, Illinois, May 19-23, 2003.
- NSF/CBMS Regional Conference on Super Convergence in Finite Element Methods, Texas Tech. University, Lubbock, Texas, May 22-26, 2000.
- Mathematics of Imaging, MSRI, Berkeley, CA, Nov. 1-5, 1999.
- Parallel Symbolic Computation, Mathematical Sciences Research Institute, Berkeley, CA, October 1-4, 1998.
- Introduction to Computational Sciences: Modeling and Simulation, Shoder Computational Science Institute, North Carolina Central University, Durham, NC, June 7- 18, 1998.
- NSF/CBMS Regional Conference on Hamiltonian Differential Equations.

Colorado School of Mines, Golden Co, June 2-6, 1997

- Parallel Computing, University of Central Florida, Orlando, May 23-June 4, 1993
- Supercomputing and Undergraduate Education for Science and Engineering, at Supercomputer Center, University of California San Diego, July 13-17, 1992.

8. SPECIAL SESSIONS / MINI-SYMPOSIUMS ORGANIZED

- Mini symposium on, Advances on Fractional PDEs, ICIAM 2019-Valencia, Spain, July 2019.
- Two mini symposiums, Modeling, Analyzing, and computing of fractional PDEs, SIAM conference on Computational Science and Engineering, Spokane, WA, USA, Feb. 25-March 01, 2019.
- Two mini symposiums, Highly Effective Numerical Methods for Systems of Partial Differential Equations, SIAM Annual meeting, Portland, OR, USA, July 09-13, 2018.
- Two mini-symposiums, Fractional PDEs: Modeling and Computation, SIAM Annual meeting Pittsburg, PA, USA, July 14-17, 2017.
- Two mini-symposiums, Advances in Computational Fractional PDEs, SIAM Conference on Computational Sciences and Engineering, Atlanta, Georgia, USA, Feb. 27-March 03, 2017
- Two mini symposiums, Highly Accurate and Effective Numerical Methods for Partial Differential Equations, The 2nd Annual Meeting of SIAM Central States Section, University of Arkansas at Little Rock, Little Rock, Arkansas, USA, September 30 — October 2, 2016
- AMS Special Session, Recent Advances in the Analysis and Applications of Modern Splitting Method, Joint Mathematics Meetings Henry B. Gonzalez Convention Center and Grand Hyatt San Antonio, San Antonio, TX, USA, January 10-13, 2015.
- Two Mini-Symposiums, High Order Numerical Methods for System of Partial Differential Equations with application, SIAM Annual meeting, Chicago, IL, USA, July 7-11, 2014.
- Special session on Computational Finance, 13th International Conference on Mathematical and Computational methods in Science and Engineering, Spain, June 23-27, 2013.
- Special Session on , Financial Mathematics, AMS South Eastern Meeting, Middle Tennessee State University, Murfreesboro, TN, USA, November 3-4, 2007
- Two Mini-Symposium, Advances on Modeling in Financial Mathematics, ICIAM07, Zurich, Switzerland, July 16-20, 2007.
- Two Mini-Symposium, Advances on Computation in Financial Mathematics, ICIAM07, Zurich, Switzerland, July 16-20, 2007.
- Special Session on Financial Mathematics, 7th International Conference on Mathematical and Computational methods in Science and Engineering, Illinois Institute of technology, Chicago, IL, USA, June 20-23, USA, 2007
- Mini- Symposium on Computational PDE Methods in Option Pricing, SIAM Conference on Financial Mathematics and Engineering, Boston, MA, USA, July 10-12, 2006
- Mini symposium on Computational Techniques for Chemical Systems. SIAM Conference on Computational Sciences and Engineering, Washington, DC. USA, Sept. 21-24, 2000.
- Mini symposium on Recent Advances on Splitting Methods for PDEs, Inter. Congress on Industrial and Applied Mathematics, ICIAM' 99 Edinburgh, Scotland, U.K, July 5-9, 1999.
- Mini-symposium on Finite Element Methods for Time Dependent PDEs, 9th International Conference on Mathematics of Finite Element and its Applications, Brunel University Uxbridge, England, U.K, June 25-28, 1996.

- Two sessions on Splitting Methods for PDEs at 14th IMACS World Congress on Comp. And Applied Mathematics, Georgia Tech. Atlanta, USA, July 11-15, 1994.

9. CONFERENCES ORGANIZED

- 10th International Conference on Mathematical and Computational Methods in Science and Engineering, University of Wisconsin-Madison, WI, USA, May 24-26, 2010.
- 7th International Conference on Mathematical and Computational Methods in Science and Engineering, Illinois Institute of Technology, Chicago, IL, USA, Jun 20-23, 2007.
- Midwest Numerical Analysis Day, Western Illinois University, IL, USA, April 26, 2003.
- 4th International Conference on Numerical Methods and Applications: NM&A- O (h4)' 98. Sofia, BULGARIA
- Midwest Numerical Analysis Day, Western Illinois university, Macomb, IL, April 25, 1998
- Member Organizing Committee, Sixth International Conference on Numerical Analysis and Computer Science, PLOVDIV, Bulgaria, Aug. 13-17, 1997.
- International Conference on Pure and Applied Mathematics, University of Bahrain, Bahrain, November 19-22, 1995.

10. COURSES TAUGHT:

MIDDLE TENNESSEE STATE UNIVERSITY (2005-Present)

Ph. D Computational Science:

COMS 6500: Scientific Computing, COMS7300: Numerical Methods for PDEs in Computational Science, Math7060(independent study: Mathematics of Deep Learning.

Math7060(independent study): Computational Methods for Stochastic Differential Equations, Math7060(Independent study): Computational Finance, Math7060(Independent study): Computational Methods for Nonlinear Schrodinger Equations, Math7060(independent study): Computational Stochastics

MS:

Math 6640: Thesis Research, Math 6603: Mathematics of Finance, ACSI 6040: Models in Financial Economics, Math 5310: Numerical Analysis I, ACSI 5630: Mathematics of Risk Management, ACSI 5640: Mathematics of Financial Derivatives, ACSI 5220: Mathematics of Corporate Finance

Undergraduate:

Math 4310: Numerical Analysis I, ACSI 4230: Theory of Interest Rate, ACSI 4220: Pricing Theory, ACSI 4200: Mathematics of Investment, Applied Calculus I, II, Calculus I, II, III, Applied Statistics

TECHNOLOGY TOOLS IN TEACHING: Maple, Excel, MATLAB

UNIVERSITY OF WISCONSIN- LA CROSEE (2004-2005)

Undergraduate:

Applied Calculus, Pre-Calculus, Numerical Analysis & Scientific Computing

TECHNOLOGY TOOL IN TEACHING: MATLAB

KNOX COLLEGE (2003-2004)

Undergraduate:

Mathematical Finance, Linear Algebra Finance Lab, Vector Calculus, Differential Equations with Mathematica, Elementary Statistics, Functions and Calculus

TECHNOLOGY TOOLS IN TEACHING: MATHEMATICA, EXCEL

UNIVERSITY OF WISCONSIN-MILWUKEE (Summer 2001)

Ph. D

Numerical Algorithms in Financial Mathematics

Undergraduate: Calculus III

TECHNOLOGY TOOL IN TEACHING: MATLAB

WESTERN ILLINOIS UNIVERSITY (1989-2003)**MS:**

Numerical Methods for Partial Differential Equations, Optimization, Advance Numerical Analysis, Numerical Linear Algebra, Approximation Theory.

Undergraduate:

Numerical Analysis I, II (with Maple/MATLAB), Mathematical Modeling, Ordinary Differential Equations (with Maple), Linear Algebra, Calculus I, II, III, Applied Calculus I, II, Finite Mathematics, Pre-Calculus, Computer Algebra System with Maple.

TECHNOLOGY TOOL IN TEACHING: MAPLE, MATLAB

UNIVERSITY OF CALIFORNIA LOS ANGELES: (Summer 1987, Summer1988)**Undergraduate:**

Applied Numerical Methods I, II, Calculus and Analytic Geometry II, III

UNIVERSITY OF BAHRAIN, BAHRAIN (1983-1989)**MS:**

Special Topics in Numerical Analysis, Numerical Methods for Ordinary Differential Equations, Numerical Methods for Partial Differential Equations, Computational Methods in Engineering, Theory of Differential Equations, Independent Study

Undergraduate:

Numerical Analysis, Numerical Methods for Engineers, Methods of Applied Mathematics, Linear Algebra, Differential Equations, Elements of Computing, Problems Solving, Calculus and Analytic Geometry I, II, III, Pre-Calculus,

11. GRANTS***External***

US\$42,000 Simon Foundation Collaborative research grant for Mathematicians, *Mathematical Modeling and Computation of fractional PDEs with deep learning*, 2019.

NSF Division of Mathematical Sciences, *Efficient Numerical Methods for non-linear multi-dimensional PDEs*, Dec 2008, not funded.

US\$ 1,200 NSF travel grant to attend, International Congress on Industrial and Applied Mathematics (ICIMA07), Zurich, Switzerland, July16-19, 2007

US\$2400 Mellon Foundation Grant 2003-2004,

US \$1,000 Mathematical Sciences Research Institute, Berkeley, California, award for the workshop on Parallel Computing, Nov. 1998

US \$ 400 Shoder Computational Science Institute grant to attend workshop at University of Central North Carolina, 1997

US\$ 500 NSF, grant to attend workshop at Supercomputer Center, University of California San Diego, 1992.

Internal

US\$40,000, FRCAC, Synergy grant, Middle Tennessee State University, 2007-2009

US\$8,000, FRCAC, Middle Tennessee State University, 2006-2007.

US\$8,000, FRCAC, Middle Tennessee State University, 2005-2006.

12. REFEREEING (articles refereed for the following journals)

SIAM Journal on Numerical Analysis

SIAM Journal on Financial Mathematics

Mathematical and Computer Modeling

Computers & Mathematics with Applications

Journal of Computational Finance

Advances in Numerical Analysis

International Journal of Computer Mathematics

Journal of Mathematical Analysis and Applications

Numerical Algorithms

Numerical Methods for Partial Differential Equations

Applied Numerical Mathematics

International Journal Numerical Methods for Engineering

Journal of Computational and Applied Mathematics

IMA Journal of Numerical Analysis

Journal of Quantitative Finance

Applied Mathematics and Computing

International Journal of Mathematics and Decision Sciences

Applied Mathematics and Computation

CURRICULUM DEVELOPMENT:***Middle Tennessee State University (2005-Present)***

Developed several graduate courses for the Computational Science PhD program.

Actuarial and Financial Mathematics concentration under general education requirement for graduate program.

Mathematics of Corporate Finance ACSI 4220 for Actuarial science concentration.

Western Illinois University (1989-2002)

Developed special track and concentration in Computational Mathematics for undergraduate

Developed Computer algebra system course using Maple for undergraduate students

Developed financial mathematics courses for master's program.

University of Bahrain, Bahrain (1983-1989)

Developed undergraduate and graduate courses in Computational and Applied Mathematics

Developed Graduate course in Numerical Methods for Partial Differential Equations

Developed Graduate course in Numerical Methods for Ordinary Differential Equations

Developed Undergraduate course in Methods of Applied Mathematics

ADMINISTRATIVE EXPERIENCE:***Middle Tennessee State University (2005-Present)***

Interim Director Computational Science Ph.D. Program (Spring 2011), Graduate Program Director (2008-2010), University General Education Committee, University grade Appeal committee, Statistics curriculum group, Actuarial Science group, Research and Development committee, graduate committee, University Undergraduate research committee (2016-present), member computational science faculty council

Western Illinois University (1989-2002)

Chair Graduate Committee (1999-2002), College of Arts and Sciences Faculty Council, College of Arts & Science Curriculum Committee, Graduate Council, Personnel Committee, Honors Program, Numerical Analysis Group (Coordinator), Colloquium Committee, Computers Affairs Committee, College of Arts & Science ASOR Committee.

University of Bahrain (1983-1989)

Curriculum development committee, Appointment committee, Research and Graduate program committee, College of Arts and Science curriculum committee. Chair graduate committee (1986-1989)