

# Curriculum Vitae

## Dr. Gul Zaman

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Department of Mathematics	Contact
University of Malakand Chakdara	Office: +92 945 763-442(3029)
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### 1 Objective

I am interested particularly in **Mathematical Biology and Fluid Mechanics** such as mathematical model of heart and blood circulation in human body, population dynamics, epidemics dynamics and infectious diseases with optimal control, and ecological modeling. Moreover, I am highly appreciating any research activity in others area of applied mathematics. I believe that applied mathematics as tool-builders, therefore I would like to learn and use applied mathematics which applicable to a broad diversity of many research field and useful in daily life.

### 2 Personal

Father's Name:	Abbas Khan
Qualification:	Ph.D (Applied Mathematics)
Date of birth:	05-04-1973
Nationality:	Pakistani
Address:	Dir Timargara, Khyber Pakhtunkhwa,

### 3 Current Position

Assistant Professor & Chief Proctor  
Department of Mathematics  
University of Malakand Chakdara,  
Khyber Pakhtunkhwa, Pakistan

### 4 Academics

**Ph.D** (Applied Mathematics)

Department of Mathematics, Pusan National University, Seoul Korea (2008)  
Dissertation title “**Blood Flow of Oldroyd-B Type Fluids Induced by Brownian Force in a Vessel**”

**M.Phil** (M.S Mathematics)

Department of Mathematics, Konkuk University, Seoul Korea (2006)  
Dissertation title “**Stability Analysis of Spruce Budworm Population and Optimal Control**”

**M.Sc** (Mathematics)

Department of Mathematics, Gomal University, Pakistan (1997)

**B.Sc** (Maths A, B and Physics)

University of Peshawar, Pakistan (1995)

### 5 Theoretical Knowledge

Numerical Analysis 1,2

Complex Analysis 1,2,3

Differential Equations

Algebra 1,2

Partial differential Equations

Bio-Mathematics

Real Analysis

Mathematical Method

**Mathematical Modeling**  
**Optimal Dynamics**  
**Numerical Integration**  
**Control Theory**  
**Non Linear Analysis**  
**Computational Mathematics**

## **6 Computer Skills**

MATLAB  
Fortran77  
LATEX  
TEX  
Microsoft Word processing  
Graphics (Power Point)  
Data bases (BIDS and internet sites)  
Well Experience of using E-mail and Internet

## **7 Current Research Project**

1. Vector-borne diseases (Dengue) (in progress)  
Control of dengue haemorrhagic fever in Pakistan
2. Hepatitis B and C (in progress)  
Stability and Optimal Control
3. Cool Energy Project with SCEES and SMME (initial stage)
4. Flooding Modeling (research proposal)

## 8 Subject taught

1. Applied Dimensional Analysis and Modeling
2. Mathematical Modeling
3. Introduction to Mathematical Biology
4. Computational Mathematics
5. Hydrodynamics & Differential Equations
6. Optimization Theory
7. Differential Equations

## 9 Student Supervision

1. Samreen Sharif M.Phil CAMP (Degree awarded)  
Dissertation title “**Mathematical Models of Infectious Diseases and Role of Optimal Control**”
2. Abid Lashari Ph.D CAMP (Dissertation Submitted)  
Dissertation title “**Mathematical Models of Vector Borne Disease and Optimal Control**”
3. Muhammad Iltaf Khan M.Phil (Dissertation Submitted)
4. Muhammad Anwer Zeb Ph.D (in Progress)
5. Muhammad Rashad Ph.D (in Progress)
6. Muhammad Shah Zeb Ph.D COMSATS (co-supervise)
7. Roman Ullah Ph.D COMSATS (co-supervise)

## 10 Research activities

1. Infectious Diseases and Epidemic
2. Predator-Prey Population and Mathematical Modeling
3. Fluid Dynamics (Blood flow in a vessel and mathematical modeling)
4. Optimal Control Theory and Applications
5. Homotopy Perturbation Method

## 6. Stability Analysis and Computational Modeling

## 11 Member

1. Korean Mathematical Society (KMS)
2. Society for Industrial and Applied Mathematics (SIAM)
3. Korean Society for Mathematical Biology (KSMB)
4. Korean Society for Industrial and Applied Mathematics (KSIAM)

## 12 Professional Skills

1. KISAM work shop Seoul National University Summer 2005
2. Pusan-Komamoto work shop on Mathematics in Japan Feb 2007
3. Pusan-Kyung Sang Mathematical Society in June 2007 Korea
4. 6th ICIAM07 in Switzerland
5. ICMB07 in Malaysia
6. KSMB 2nd meeting October 2007 in KAIST Korea
7. KISAM work shop Korea
8. 6th International Conference on SCA June 2008
9. 12th Asian Congress of Fluid Mechanics in KAIST
10. 2008 Global KMS International Conference Jeju

## 13 Award

1. First Position in Ph.D Course Work  
obtained 100% marks PNU South Korea
2. Best Teacher for Spring Semester 2009 NUST Islamabad

## 14 Work present

1. **Stability Analysis in the Nonlinear Spruce Budworm Population Model**, Pusan-Komamoto work shop on Mathematical analysis and its application 3-4 Feb 2007 Japan.
2. **The blood flow in vessel with compressible diameter approach by an Oldroyd-B fluid**, Pusan-Kyung Sang Mathematical society work shop 2nd June 2007 in Kyung Sang University Pusan, South Korea.
3. **Stability techniques in the SIR epidemic model**, 6th International Congress on Industrial and applied Mathematics 16-20 July 2007, in Zurich Switzerland.
4. **The effect of constant yield harvesting analysis in the spruce budworm population dynamics**, International conference on mathematical biology 4 – 6th, September 2007, Kuala Lumpur Malaysia.
5. **Optimal Vaccination and Treatment in the SIR Model**, in KISAM on 23-24th November 2007, South Korea.
6. **Control in the Smoking Dynamics**, in The 1st Young-Nam Young Mathematician Conference 28-29th March 2008, PNU Korea.
7. **Steady Oldroyd-B fluid in a blood vessel**, the Korean Mathematical Society 25-26th April 2008, Keung Meung University, South Korea.
8. **A Mathematical Study of Human Blood Flow in a Vessel**, Mathematics Colloquium for Junior Mathematicians May second 2008, PNU Korea.
9. **Mathematical Modeling in Biology**, Centre for Advanced Mathematics and Physics 7th July 2008, NUST, Pakistan.
10. **The Influence of the Orientation Stress Tensor on the Blood Flow in a Vessel**, the 12th Asian Congress of Fluid Mechanics 18-21 August 2008, Daejeon, Korea.
11. **Optimal Control of communicable diseases and prevention of epidemics**, Mathematics Colloquium for Junior Mathematicians August 2008, PNU Korea.
12. **Optimal vaccination of communicable diseases**, Global KMS International Conference 2008, Jeju Korea.
13. **Stability and control in a predator population**, International Bhurban Conference on Applied Sciences & Technology, Jan. 2009, Islamabad Pakistan.

14. **Stability and optimal control in epidemic models**, Conference on Recent Advances in Mathematical Methods, Models & Applications, April 18-19th 2009, LUMS Lahore, Pakistan.
15. **Stability and optimal control in epidemic models**, The 10th International Conference on Nonlinear Functional Analysis and Applications July 27-31 2009, Kyungnam University South Korea.
16. **Blood flow in a vessel with numerical simulations**, Intensive Workshop on Mathematical Models in Biology, 21-23th July 2009 South Korea.
17. **Optimal treatment in smoking dynamics**, Conference on Recent Advances in Mathematical Methods, Models & Applications, April 17-18th 2010, LUMS Lahore, Pakistan.
18. **Dynamics of human blood in a vessel and orientation stress tensor**, The International Conference on Frustrated Spins Systems, Cold Atoms, Nanomaterials, July 14-16th 2010, Hanoi, Vietnam.
19. **Dynamical behavior and control of communicable diseases** 24th August 2011, Pusan National University, South Korea.

## 15 Invited Talk

1. **The Non-Newtonian Blood Flow in Vessel with the Configuration of Brownian Force**, the 25th PNU-POSTECH Algebraic Combinatorics Seminar May 3, 2008, POSTECH Korea.
2. **Stability analysis and optimal control in communicable diseases**, COMSATS, May 4, 2009, Islamabad Pakistan.
3. **Dynamical behavior of infectious disease and role of optimal control theory**, 09 International Workshop on Nonlinear PDE and Applications 29 June- 2 July Pusan National University South Korea.
4. **Some Mathematical Models in Biology** Summer Intensive Lecturers Program for Mathematical Biology 17-20th July Pusan National University South Korea.
5. **Summer School for UG students**, 28 June-2nd July Department of Mathematics PNU, South Korea.
6. **Annual Meeting of Korean Society for Mathematical Biology** ,

Modeling Dynamical Interactions Between Leptospirosis Infected Vector and Human Population, 25-26 August 2011, UNIST South Korea.

## 16 Publications

### 16.1 Published

1. **Gul Zaman**, Kang Yong Han, Jung Il Hyo, Optimal vaccination and treatment in the SIR epidemic model, Proceeding of the KSIAM, Vol. 3(2), (2007) pp.31-33.
2. **Gul Zaman**, Kang Yong Han, Jung Il Hyo, The effect of constant yield harvesting analysis in the spruce budworm population dynamics, Proceeding in American institute of physics. Vol. 971, (2008) pp.142-147.
3. **Gul Zaman**, Kang Yong Han, Jung Il Hyo, A Nonlinear Mathematical Model of Blood Flow, Proc. 6th Int. Conf. Scientific Computing and Application (2008) pp. 147-150.
4. **Gul Zaman**, Jung Il Hyo, Stability techniques in SIR epidemic models, Proceeding in Applied Mathematic and Mechanics Vol.7, (2007) 2030063-2030064.
5. **Gul Zaman**, Kang Yong Han, Jung Il Hyo, Stability and optimal vaccination of an SIR epidemic model, BioSystems 93 (2008) 240-249.
6. **Gul Zaman**, Kang Yong Han, Jung Il Hyo, The influence of the orientation stress tensor on the blood flow in a vessel, Proceeding of 12ACFM, Deajon, Korea, August (2008) M-1A-4.
7. **Gul Zaman**, Kang Yong Han, Jung Il Hyo, Optimal control in the SIR epidemic model with time delay, BioSystem 98 (2009) 43-50.
8. **Gul Zaman**, Kang Yong Han, Jung Il Hyo, Stability and control in the predator population Proceedings of 6th International Bhurban Conference on Applied Sciences and Technology, IBCAST-2009, Vol. 2, (2009) pp. 271-274.
9. J.Ali, S. Islam, S.-U. Islam and **Gul Zaman**, The solution of multipoint boundary value problems by the Optimal Homotopy Asymptotic Method, Comput. Math. Appl, 59 (2010) 2000-2006.
10. **Gul Zaman**, Dynamical behavior of Leptospirosis disease and role of optimal control theory, Int. J. Math. Comp., Vol. 7, No: J10, (2010) 80-92.
11. **Gul Zaman**, Kang Yong Han, Jung Il Hyo, Stability and the effect of



- harvesting in a budworm population model, *Journal of KSIAM* 14(3) (2010) 163-173.
12. S. Islam, Saqib Zia, **Gul Zaman**, Muhammad R. Mohyuddin, Unsteady flow of Jeffery fluid induced by time dependent volume flow rate, *World Applied Sciences Journal* 10(1) (2010) 19-22.
13. Rehan Ali Shah, S. Islam, **Gul Zaman**, Tariq Hussain, Solution of stagnation point flow with heat transfer analysis by optimal Homotopy Asymptotic technique, *PROCEEDINGS OF THE ROMANIAN ACADEMY, Series A, Volume 11, Number 4* (2010), pp. 312-321.
14. **Gul Zaman**, S. Islam, A non-standard numerical method for a giving up smoking model, *Nonlinear Science Letter A, Vol. 2, No.1*, (2011) 59-64.
15. J. Ali, S. Islam, M. Tariq Rahim and **Gul Zaman**, The solution of special twelfth order boundary value problems by the optimal Homotopy Asymptotic Method, *World Applied Sciences Journal* 11(3) (2010) 371-378.
16. Abid Ali Lashari, **Gul Zaman**, Global dynamics of vector-borne diseases with horizontal transmission in host population, *Computers & Mathematics with Applications*, Vol. 61(4) (2011) pp. 745-754.
17. **Gul Zaman**, Optimal campaign in the smoking dynamics, *Computational and Mathematical Methods in Medicine, Volume 2011* (2011), Article ID 163834, 9 pages, doi:10.1155/2011/163834.
18. Saeed Islam, Hamid Khan, Inayat Ali Shah and **Gul Zaman**, An axisymmetric squeezing fluid flow between the two infinite parallel plates in a porous medium channel, *Mathematical Problem in Engineering, Volume 2011* (2011), Article ID 349803, 10 pages, doi:10.1155/2011/349803.
19. **Gul Zaman**, Qualitative behavior of giving up smoking model, *Bull. Malays. Math. Sci. Soc. (2)* 34(2) (2011), 403-415.
20. **Gul Zaman**, Kang Yong Han, Jung Il Hyo, Orientational stress tensor of polymer solution with application to blood flow, *Modern Physics Letters B, Vol. 25, Nos. 12 & 13* (2011) 1157-1166.
21. Murad Ullah, S. Islam, **Gul Zaman**, S. Naeem Khalid, A note on squeezing flow between two infinite parallel plates with slip boundary conditions, *International J. Phys. Sci. Vol. 6*(14) (2011), pp. 3296-3301.
22. Javed Ali, Saeed Islam, Hamid Khan, **Gul Zaman**, The Solution of a Parameterized Sixth Order Boundary Value Problem by the Optimal Homotopy Asymptotic Method *PROCEEDINGS OF THE ROMANIAN ACADEMY, Se-*

ries A, Volume 12 , Number 3, 2011, pp. 167-172.

23. Abid Ali Lashari, **Gul Zaman**, Optimal Control of a vector borne disease with horizontal transmission, *Nonlinear Analysis: Real World Applications*, Volume 13, Issue 1, February 2012, pp. 203-212.

24. S. Islam, Murad Ullah, **Gul Zaman**, M. Idrees, Approximate Solutions to MHD Squeezing fluid flow, *J. Appl. Math. & Informatics* Vol. 29(2011), No. 5-6, pp. 1081-1096.

25. **Gul Zaman**, S.H. Shaker, Dynamics and Control of a System of Two Non-Interacting Preys with Common Predator, *Mathematical Method in the Applied Sciences*, 34 (2011) 2259-2273.

26. **Gul Zaman**, Saeed Islam, Kang Yong Han, Jung Il Hyo, Blood flow of an Oldroyd-B fluid in a blood vessel incorporating a Brownian stress, *SCIENCE CHINA Physics, Mechanics & Astronomy*, January 2012 Vol. 55 No. number: 1-7.

27. **Gul Zaman**, M. Altaf Khan, Saeed Islam, M. Ikhtlaq Chohan, Il Hyo Jung, Modeling dynamical interactions between Leptospirosis infected vector and human population, *Applied Mathematical Sciences*, Vol. 6, 2012, no. 26, 1287-1302.

## 16.2 Accepted

1. Gul Zaman, Murad Ullah, S. Islam, **Some exact solutions for two dimensional MHD flows of a couple stress fluids in a porous medium**, *Int.J. Math. Comp.* 2010.

2. Gul Zaman, Kang Yong Han, Jung Il Hyo, **Stability and control in a predator population**, Appear in JCP.

3. Gul Zaman, M. Idrees, S. Islam, Muneeb Ur Rehman<sup>2</sup>, Manzoor Ellahi **Application of optimal homotopy asymptotic method to squeezing flow between two infinite plates with slip boundary conditions**, *ZUSA*, 2010.

4. Abid Ali Lashari, K. Hattaf, Gul Zaman, **A delay differential equation model of a vector borne disease with direct transmission**, Accepted *International Journal of Ecological Economics & Statistics (IJEES)*.

### 16.3 Submitted

1. Gul Zaman, Kang Yong Han, Jung Il Hyo, **Stability analysis in the nonlinear model of the spruce budworm population with harvesting**, Submitted BKMS 2009.
2. Gul Zaman, Kang Yong Han, Jung Il Hyo, **Stability techniques and optimal control in the SIR epidemic model**, submitted for publication Physica D.
3. Gul Zaman, Kang Yong Han, Jung Il Hyo, **On the flow of an Oldroyd-B fluid with the Brownian stress in a blood vessel**, in communication with Physcis Letter A 2009.
4. Gul Zaman, Kang Yong Han, Jung Il Hyo, **Stability analysis and harvesting in a two-prey and one-predator model**, submitted to Applied Mathematics and Computation 2008.
5. Gul Zaman, M. Idrees, Sirajul Haq S. Islam, **Application of Optimal Homotopy Asymptotic Method to Fourth Order Boundary Value Problems**, submitted to NZ Journal of Mathematics, 2009.
6. Gul Zaman, H. Saito, **Optimal vaccination of an SEIR endemic model with variable infectivity and infinite delay**, submitted to Math .Biosc., 2010.
7. Gul Zaman, Kang Yong Han, Jung Il Hyo, **Analysis of worm propagation modeling and optimal control**, submitted to Comp. & Sect. Journal, 2009.
8. Gul Zaman, Kang Yong Han, Jung Il Hyo, **Optimal control with age dependent infection and variable infectivity**, Submitted, 2009.
9. Gul Zaman, Kang Yong Han, Jung Il Hyo, **A time dependent flow of Oldroyd-B fluid in circular vessel with the orientation stress tensor**, submitted Non-linear Mechanics 2009.
10. Gul Zaman, S. Islam, **Analytical approximate solution of giving up smoking model by homotopy perturbation method**, submitted 2010.
11. Mubasher Jamil, Gul Zaman, **Some new dynamical features of interacting generalized Chaplygin gas**, submitted 2010.
12. Abid Ali Lashari, Gul Zaman, **Dynamical features of dengue disease with saturating incidence rate**, submitted 2010.
13. M. Ullah, M. Idrees, S. Islam, Gul Zaman, M. Ur-rehman, **Application**

of Optimal Homotopy Asymptotic Method to MHD Squeezing Fluid flow, submitted.

14. Abid Ali Lashari, Gul Zaman, K. Hattaf, Xue-Zhi Li, **Backward bifurcation and optimal control of vector borne disease**, submitted 2010.

15. Aftab Khan, Saeed Islam, Gul Zaman, S. Ul. Islam, **Buried point source in a rotating incompressible transversely isotropic homogeneous medium** Submitted to Comm. Korean Math. Soci. 2011.

16. Gul Zaman, Kang Yong Han, Jung Il Hyo, **Dynamics of a smoking model with disease death rate**, submitted 2011.

17. Gul Zaman, Muhammad Altaf Khan, Saeed Islam, Il Hyo Jung, **Prevention of Leptospirosis infected vector and human population by multiple control variables**, submitted 2011.

18. Roman Ullah, Gul Zaman, Saeed Islam, **Dynamical features and vaccination strategies in epidemic model**, submitted 2011.

19. Abid Ali Lashari, Gul Zaman, K. Hattaf, Xue-Zhi Li, **Prevention of Malaria epidemics using multiple control variables**, submitted 2011.

20. Gul Zaman, Saeed Islam, **Analytical solution of SEIR epidemic model by homotopy perturbation method**, submitted 2011.

21. Gul Zaman, Muhammad Iltaf Khan, Saeed Islam, **Mathematical formulation and dynamical interaction of leptospirosis disease**, submitted 2011.

22. Vedat Suat ERTURK, Gul Zaman, Shaher Momani, **A numeric-analytic method for approximating a giving up smoking model containing fractional derivatives**, submitted 2011.

23. Anwer Zeb, Gul Zaman, **Dynamical behavior of SIRC model with fractional order**, in progress.

## 17 Total citation and impact factor

1. Total Citation 62
2. Total Impact Factor 14.2230

## 18 Administrative work

1. **Cheif Proctor** (Present)  
University of Malakand
2. Presenter from NUST in the meeting held in Pakistan Engineering Council Islamabad for preparation of Biomedical Engineering program.
3. Meeting with rector NUST and AMC at GHQ to develop research in Biomedical field.
4. Member of advisor committee of the RCMS MS–Ph.D program.
5. Participate the meeting to start B.E Biomedical Engineering in NUST.
6. Member of the technical committee of the 35th International Nathiagali Summer College on Physics & Contemporary Needs.
7. In charge of transport at CAMP.
8. Convener of M.Phil–Ph.D Mathematics program at University of Malakand.

## 19 Teaching Experience

- 1: Assistant Professor  
Department of Mathematics  
University of Malakand  
Oct 2010——Present
- 2: Assistant Professor (NUST)  
December 2008——Oct 2010-.
- 3: Research Associate (Department of Mathematics Pusan National University)  
September 2006——November 2008.
- 4: Full time researcher (Institute of Mathematical Sciences, College of Natural Sciences, Pusan National University)  
November 2004——November 2006.
- 5: Lecturer (Institute of Mathematical Sciences, College of Natural Sciences, Pusan National University)  
March 2000——February 2004.
- 6: Teacher (Private Elem, Middle, High in South Korea) after noon

April 2000——February 2004.

## **20 Reviewer of International Journals**

1. International Journal of the Physical Sciences
2. Journal of the Korean Society for Industrial and Applied Mathematics
3. Dynamical System & Differential Equations
4. World Applied Science Journal
5. Communication of the Korean Mathematical Society

## **21 Research Collaboration**

1. Work in progress with Professor Jung Il Hyo my Ph.D advisor Pusan National University South Korea
2. Professor Xue-Zhi Li, Xinyang Normal University, China
3. Professor Saito Kyungpuk National University South Korea
4. Dr.Saeed Islam COMSATS Islamabad
5. Professor Sirajul Haq Islamia College University Peshawar
6. Professor S.H. Shaker, King Saud University Saudi Arabia
7. Research in progress with Professor Kang Young Han Ulsan University, South Korea
8. Dr. Shaban Alays Egypt
9. Professor Shaher Momani, The University of Jordan, Jordan
10. Professor Vedat Suat ERTURK, Ondokuz Mayıs University, Turkey

## **22 Languages**

1. Pushto
2. Urdu
3. English

4. Arabic
5. Korean

## **23 Hobbies/Extracurricular activities**

Worked for five years with a community base organization namely falashi tanzeem Nawjawana amlookdara based at Talash Dir(lower) Khyber Pakhtunkhawa

1⇒ To raise awareness among the people

2⇒ Protection of environment

3⇒ Self help 4 ⇒ Social Development

5⇒ Women and Development

6 ⇒ Bad effects of intoxicating Drug

Reading books

Playing Cricket

A member of the village social welfare committee

## **24 A list of References**

### **Jung Il Hyo**

Professor of Mathematics  
Pusan National University  
Korea

### **Park Jong Youl**

Professor of Mathematics  
Pusan National University  
Korea

### **Faiz Ahmad**

Professor of Mathematics

Centre for Advanced Mathematics and Physics  
NUST, Islamabad Pakistan