

# KANIZ FATEMA NIPA

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## RESEARCH INTERESTS

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Mathematical Modeling, Dynamical Systems, Differential Equations, Mathematical Biology

## EDUCATION

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**Ph.D. in Applied Mathematics** August 2020

Texas Tech University, Lubbock, TX

Advisor: Linda J.S. Allen & Co-advisor: Sophia Jang

Dissertation: Effects of Demographic, Environmental and Seasonal Variability on Disease Outbreaks in Stochastic Vector-host, Multi-patch and Dengue Epidemic Models

**M.S. in Mathematics** May 2017

Texas Tech University, Lubbock, TX

**M.S. in Applied Mathematics** August 2013

University of Dhaka, Dhaka, Bangladesh

**B.S. in Mathematics** August 2011

University of Dhaka, Dhaka, Bangladesh

## PROFESSIONAL EXPERIENCE

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**Postdoctoral Research Associate** Mar. 2021 to Present

*Center for the Ecology of Infectious Diseases (CEID)*

University of Georgia, Athens, Georgia

**Visiting Research fellow of Mathematics** Oct. 2020 to Feb. 2021

*Department of Mathematics*

The University of Texas at San Antonio, San Antonio, Texas

**Graduate Part-Time Instructor** Spring 2020

*Department of Mathematics and Statistics, Texas Tech University, Lubbock, TX*

Taught online Calculus-II with Applications

**Research Assistant** Spring 2017 to Fall 2019, Summer 2020

*Department of Mathematics and Statistics, Texas Tech University, Lubbock, TX*

I worked on my Ph.D. in Mathematical Epidemiology under the supervision of Dr. Linda Allen from summer 2017 & Dr. Sophia Jang from Fall 2019. I also worked in a NSF funded project with Dr. Linda Allen.

**Student Assistant** Spring 2016

*Department of Mathematics and Statistics, Texas Tech University, Lubbock, TX*

Leading and Instructing a discussing group of struggling students of Calculus-I and Calculus-II. Consulting and identifying their problems individually or in a group and help them find the solutions.

**Teacher(Lecturer)**

*University of Asia Pacific, Dhaka, Bangladesh*

May 2014 to July 2015

Taught undergraduate level Linear Algebra, Calculus, Differential Equation and Matrices, Co-ordinate Geometry and Vector Analysis, Complex Variable and Fourier Transformations.

## RELEVANT COURSEWORK

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- Mathematical Statistics
- ODE-PDE
- Numerical Analysis
- Linear Optimization
- Mathematical Biology
- Quantum Field Theory
- Complex Analysis

## BOOK CHAPTER

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**Nipa**, K. F., & Allen, L. J. S. (2021). The effect of demographic variability and periodic fluctuations on disease outbreaks in a vector–host epidemic model. In M. I. Teboh-Ewungkem & G. A. Ngwa (Eds.), *Infectious diseases and our planet* (pp. 15–35). Springer.

[https://doi.org/10.1007/978-3-030-50826-5\\_2](https://doi.org/10.1007/978-3-030-50826-5_2)

## JOURNAL PUBLICATIONS

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**Nipa**, K. F., & Allen, L. J. (2020a). Disease emergence in multi-patch stochastic epidemic models with demographic and seasonal variability. *Bulletin of Mathematical Biology*, *82*(12), 1–30.

<https://doi.org/10.1007/s11538-020-00831-x>

**Nipa**, K. F., Jang, S. R.-J., & Allen, L. J. S. (2020). The effect of demographic and environmental variability on disease outbreak for a dengue model with a seasonally varying vector population. *Mathematical Biosciences*(108516).

<https://doi.org/10.1016/j.mbs.2020.108516>

Kamrujjaman, M., Mahmud, M. S., Ahmed, S., Qayumand, M. O., Alam, M. M., **Nipa**, K. F., . . . Bulut, U. (2021). Sars-cov-2 and rohingya refugee camp, bangladesh: Uncertainty and how the government took over the situation. *Biology*, *10*(2).

<https://doi.org/10.3390/biology10020124>

## SUBMITTED MANUSCRIPT

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Hassan, M. N., Kamrujjaman, M., **Nipa**, K. F., & Mahmud, M. S. (2020). Mathematical modeling and covid-19 forecast in texas, USA: a prediction model analysis and the probability of disease outbreak. *Submitted*.

## MANUSCRIPTS IN PREP

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**Nipa**, K. F., & Jang, S. (2020). Demographical, environmental and seasonal variability on disease outbreak for two-strain dengue model. *In prep.*

**Nipa**, K. F., & Allen, L. J. S. (2020b). Disease spread and persistence of stochastic hantavirus infection in rodents with direct and indirect transmission concentrating with demographic and seasonal variability. *In prep.*

Aguilar, J. B., Faust, J. S., Westafer, L. M., **Nipa**, K. F., Hassan, M. N., Abdussalam, Y. A., & Gutierrez, J. B. (2020). A model describing covid-19 community transmission taking into account asymptomatic carriers and risk mitigation. *In prep.*

## PROGRAMMING/COMPUTING LANGUAGES

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- MATLAB
- MATHEMATICA
- MAPLE
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- FORTRAN

## TEACHING EXPERIENCE

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### **Graduate Part-Time Instructor**

*Department of Mathematics and Statistics*

*Texas Tech University, Lubbock, TX*

Calculus II with Applications (Online)

Spring 2020

### **Lecturer**

*Department of Basic Sciences and Humanities*

*University of Asia Pacific, Dhaka, Bangladesh*

Differential Equation and Matrices

Spring 2014 to Fall 2015

Co-ordinate Geometry and Vector Analysis

Spring 2014 to Fall 2015

Linear Algebra

Spring 2014 to Fall 2015

Complex Variable and Fourier Transformations

Spring 2014 to Fall 2015

### **Student Assistant**

*Department of Mathematics and Statistics*

*Texas Tech University, Lubbock, TX*

Calculus-I with Application

Spring 2016

Calculus-II with Application

Spring 2016

## THESIS AND PROJECT WORK

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### **Biomath-I Project**

*Department of Mathematics and Statistics*

Title: The Leslie /Gower Model

Fall 2016

*Texas Tech University, Lubbock, TX*

### **Biomath-II Group Project**

*Department of Mathematics and Statistics*

Title: Dynamical Modeling on Two Competing Phytoplankton

Spring 2017

*Texas Tech University, Lubbock, TX*

### **MS Thesis**

*Department of Mathematics*

Title: Analyzing and Comparing of Different Methods for Solving Cutting Stock Problem

February 2013 to June 2013

*University of Dhaka, Dhaka, Bangladesh*

### **BS Project**

*Department of Mathematics*

Title: Stability of Models for Interacting Populations

March 2011 to April 2011

*University of Dhaka, Dhaka, Bangladesh*

## CONFERENCE/SEMINAR PRESENTATIONS

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### **8th Annual San Antonio Postdoctoral Research Forum (SAPRF 2020)**

*iPoster presentation*

Poster: Demographic Variability and Seasonal Variations on Disease Transmission and Dispersal in Stochastic Multi-Patch Epidemic Model.

*December 2020*

### **SIAM Life Science (SIAM LS-2020)**

*Siam Virtual Meeting*

Talk: The Effect of Demographic Variability and Periodic Fluctuations on Disease Outbreaks in a Vector-Host Epidemic Model.

*June 2020*

### **Joint Mathematics Meetings (JMM 2020)**

*Denver, Colorado*

Talk: Disease Emergence and Persistence in a Multi-Patch Stochastic Epidemic Model with Demographic, Environmental and Periodic Variability.

*January 2020*

### **Bangladesh Mathematical Society (BMS 2019)**

*University of Dhaka, Dhaka, Bangladesh*

Talk: Demographic Variability, Environmental Variability, and Periodic Fluctuations in Stochastic Epidemic Models with Multiple Patches.

*December 2019*

### **Seventh International Conference on Mathematical Modeling and Analysis of Populations in Biological systems (ICMA 2019)**

*Tempe, Arizona*

Talk: Demographic Variability, Environmental Variability, and Periodic Fluctuations in Stochastic Epidemic Models with Multiple Patches.

*October 2019*

### **2019 Annual Meeting of the Society for Mathematical Biology (SMB)**

*Montreal, Canada*

Talk: Demographic Variability, Environmental Variability, and Periodic Fluctuations in Stochastic Epidemic Models with Multiple Patches.

*July 2019*

**The Fifth International Conference on Computational and Mathematical Population Dynamics (CMPD5)**

*Florida Atlantic University, Fort Lauderdale, Florida*

*May 2019*

Talk: The Effect of Demographic Variability, Environmental Variability, and Periodic Fluctuations in Stochastic Epidemic Models.

**10th Texas Tech Annual Biological Sciences Symposium (TTABSS)**

*Texas Tech University, Lubbock, TX*

*April 2019*

Poster: The Effects of Seasonal Variations on Disease Transmission and Mobility in Stochastic Epidemic Models.

**Bangladesh Mathematical Society (BMS 2018)**

*University of Dhaka, Dhaka, Bangladesh*

*December 2018*

Poster: The Effect of Demographic Variability, Environmental Variability, and Periodic Fluctuations on Disease Outbreaks in Stochastic Epidemic Models.

**International Symposium on Biomathematics and Ecology Education and Research (BEER)**

*Arizona State University, Tempe*

*October 2018*

Talk: The Effect of Demographic Variability, Environmental Variability, and Periodic Fluctuations on Stochastic Epidemic Models.

**2018 Annual Meeting of the Society for Mathematical Biology and the Japanese Society for Mathematical Biology**

*University of Sydney, Sydney, Australia*

*July 2018*

Poster: The Effect of Demographic Variability, Environmental Variability, and Periodic Fluctuations on Stochastic Epidemic Models.

**Biology and Medicine Through Mathematics Conference 2018**

*May-June 2018*

*Virginia Commonwealth University, Richmond, VA*

Poster: The Effect of Environmental Variability and Periodic Fluctuations on Disease Outbreaks in Stochastic Epidemic Models.

**CONFERENCE JUDGE/MODERATOR/SESSION CHAIR**

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**The Fifth International Conference on Computational and Mathematical Population Dynamics (CMPD5)**

*May 2019*

*Florida Atlantic University, Fort Lauderdale, Florida*

**2019 Graduate Student Poster Competition**

*Mar 2019*

*Texas Tech University, Lubbock, TX*

**2018 Arts and Humanities Graduate Student Research Conference**

*Nov 2018*

*Texas Tech University, Lubbock, TX*

## PROFESSIONAL MEMBERSHIP

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- Society for Mathematical Biology (SMB), April 2017-Present
- Bangladesh Mathematical Society(BMS), December 2017-Present
- Society of Industrial and Applied Mathematics(SIAM), September 2015-Present
- American Mathematical Society (AMS), September 2015-Present
- Association for Women in Mathematics (AWM), September 2018-Present

## AWARDS

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- AMS Travel Fund for JMM-2020, November 2019
- NSF Travel Fund for ICMA VII, September 2019
- NSF Travel Fund for CMPD5, May 2019
- BAMM SIAM Travel Grants, March 2018
- SMB Landahl Travel Grants, May 2018
- TGTC Travel Grants, February 2016
- Presidential Graduate Fellowship, Fall 2015-Summer 2018

## REFERENCES

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| • Linda J. S. Allen, Ph.D.<br>Paul W. Horn Professor<br>Dept. of Mathematics and<br>Statistics<br>Texas Tech University<br>Lubbock, Texas 79409-1042<br>E-mail: linda.j.allen@ttu.edu<br>Ph: 8068341985 | • Sophia Jang, Ph.D.<br>Professor<br>Dept. of Mathematics and<br>Statistics<br>Texas Tech University<br>Lubbock, Texas 79409-1042<br>E-mail: sophia.jang@ttu.edu<br>Ph: 8068347006 | • Angela Peace, Ph.D.<br>Assistant Professor<br>Dept. of Mathematics and<br>Statistics<br>Texas Tech University<br>Lubbock, Texas 79409-1042<br>E-mail: a.peace@ttu.edu<br>Ph: 8068341014 |
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