

## SUMMARY

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PhD in Pure Mathematics, with interests spanning applied category theory, data science, graph neural networks, machine learning, graph theory, microeconomics, quantum computing, the mathematical foundations of physics, and mathematical philosophy.

## EDUCATION

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**FLORIDA STATE UNIVERSITY**

Ph.D. in Pure Mathematics

Thesis: Simplicial Methods in Graph Machine Learning

**8/2018 – 5/2024**

Tallahassee, FL

CGPA: 3.63

**QUAID-E-AZAM UNIVERSITY**

M.Phil. in Pure Mathematics

Thesis: Operator Algebras and The Foundations of Quantum Mechanics

**2/2014 – 4/2016**

Islamabad, Pakistan

CGPA: 3.80

**COMSATS INSTITUTE OF INFORMATION TECHNOLOGY**

B.S. in Mathematics

Thesis: Engineering Deutsch-Jozsa Algorithm in Cavity QED via Bragg Regime

**2/2008 – 2/2012**

Islamabad, Pakistan

CGPA: 3.28

## PUBLICATIONS

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- Foster, T. S.; **Malik, A. N.** Wiesfeler and Leman Go Global Locally. In preparation
- Capucci, M.; Gavranović, B.; **Malik, A.N.**, Rios, F., & Weinberger, J. On a fibrational construction for optics, lenses, and Dialectica categories. *entics*:14638, 4. 2024 <https://doi.org/10.46298/entics.14638>
- Behzad, M.; Adnan, N.; **Malik, A.N.**; Merchant, S.A. Technology-Embedded Hybrid Learning. *Preprints* 2018, 2018030229. <https://doi.org/10.20944/preprints201803.0229.v2>
- Xing, Y. H., Farooq, M. U., **Malik, A. N.** Effects of Gender on the Performance of Microenterprises in Pakistan. *The International Journal of Humanities & Social Studies*, 5(11). 2017
- **Malik, A.N.**, Kamran, T. Orthomodularity and the incompatibility of relativity and quantum mechanics. *Quantum Stud.: Math. Found.* 4, 171–179 (2017). <https://doi.org/10.1007/s40509-016-0092-8>
- **Malik, A.N.** Non-isometric, involutive antiautomorphisms. *arXiv:1603.08498*, 2016

## EXPERIENCE

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**ASSISTANT PROFESSOR**

Tallahassee State College

Instructor of Record:

- College Algebra
- Precalculus Trigonometry
- Mathematics in Context
- Mathematical Thinking
- Precalculus Algebra
- Calculus for Management

Services:

- Mentorship
- Outreach
- Math Jury
- Committees
- Training

**8/5/2024 – Present**

Tallahassee, FL

» Fall 2024, Spring 2025, Fall 2025, Spring 2026

» Spring 2025, Summer 2025, Fall 2025

» Summer 2025

» Fall 2025

» Spring 2026

» Spring 2026

» Faculty mentor for scholarship recipients

» Volunteered for Tallahassee Science Festival 2024

» For International Tournament for Young Mathematicians 2024

» Member of Math Advisory Committee

» Faculty Development

**ADJUNCT FACULTY**

Florida State University

**Instructor of Record:**

- Linear Algebra
- Calculus III
- Calculus II

- » Spring 2025
- » Fall 2024
- » Summer 2024

**5/6/2024 – 5/7/2025**

Tallahassee, FL

**GRADUATE TEACHING ASSISTANT**

Florida State University

**Instructor of Record:**

- Calculus III
- Calculus II
- Calculus I

- » Fall 2023, Spring 2024
- » Summer 2023
- » Fall 2022, Summer 2022

**8/19/2020 – 5/3/2024**

Tallahassee, FL

**Content Creator:**

- University-wide course notes for Pre-Calculus

**Grader:**

- Introduction to Advanced Mathematics
- Discrete Mathematics
- Ordinary Differential Equations

- » Spring 2023
- » Fall 2022
- » Fall 2020

**Lab Instructor:**

- Business Calculus

- » Spring 2022 & 2021; Summer 2021

**Graduate Student Mentor:**

- Student: Ayotuntosomi Loyer

- » Project: Simplicial Sets are Chu Spaces

**IN-CHARGE****8/21/2017 – 12/26/2017**

Islamabad, Pakistan

**Office of Hybrid Learning****COMSATS Institute of Information Technology, Virtual Campus**

- Conceptualized and implemented a proposal for a policy framework and educational model on 13 degree programs
- Piloted the transition of 2 courses from face-to-face to hybrid for 16,500 students, that shaved off 3% of total expenses
- Led a team of 15 Content Experts, 5 Instructional Designers, 3 Animation Creators, 2 Video Editors and 4 Web Developers, ensuring successful and smooth generation, processing, editing and deployment of academic content
- Responsible for organizing and coordinating faculty development programs
- Identified gaps in student ICT literacy and provided appropriate recommendations for improvement

**TEACHING ASSOCIATE****3/9/2013 – 8/22/2017**

Islamabad, Pakistan

**Department of Mathematics****COMSATS Institute of Information Technology, Virual Campus**

- Moderated the following math courses:
  - » Analytical Number Theory, Measure Theory, Operations Research, Introduction to Hilbert Spaces, Functional Analysis, Business Mathematics, Partial Differential Equations, Mathematical Statistics, Business Mathematics and Statistics, Statistical Inference, Algebra, Real Analysis
  - M.Sc. Math undergraduate projects supervised:
    - » Theorem of Maria Pia Soler, Non-exhaustive Properties of Multiplicative Groups of Matrices, Axiom of Choice: Equivalents and Implications, Current trends in Quantum Logic, Summing the Divergent, Language of the Universe: The Mathematics of Thermodynamics, A Comparison of Set Theories, Physics by SU(2), Automorphisms of General Linear Group, An Overview of Intuitionistic Logic, Extensions of Real Numbers, Constructive Calculus

**SUBEDITOR (INTERN)****10/15/2012 – 11/23/2012**

Islamabad, Pakistan

**Pakistan Council for Science and Technology**

- Subeditor for PCST's journal Science, Technology and Development
- Verification of data in Directory of Productive Scientists of Pakistan 2012
- Organised opening ceremony for Science and Innovation Policy, Pakistan, 2012

**SUBEDITOR****3/19/2011 – 9/30/2012**

Islamabad, Pakistan

**UTrade (Pvt.) Ltd.**

- Led a team of 16 journalists, providing topic guidance and content development for company's signature monthly trade magazine UTrade
- Wrote editorials and summaries for chief editor for 15 editions
- Finalized printing and distribution of magazine to readers all over Pakistan
- Critically analyzed data provided by journalists and improved data presentation

## TEACHING ASSISTANT

Department of Computer Science  
COMSATS Institute of Information Technology

- Conducted lab coding sessions for Introduction to Programming using C++ for 30 students.  
Coding sessions were held 4 times a week

12/2009 – 5/2010

Islamabad, Pakistan

## SKILLS

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### PROGRAMMING LANGUAGES

#### LIBRARIES

#### ED-TECH

#### SOFTWARE

#### LANGUAGES

**Experienced:** Python, LaTeX

pytorch | sklearn | dgl | sqlite3 | Pandas

**Familiar:** C++ | SQL

networkx | pix2pix | numpy | multiprocessing

**Grading Tools:** Gradescope | Crowdmark

LMS: Canvas | Blackboard

CorelDRAW | MatLab | Maple

**Native:** Urdu | Potohari | Punjabi

**Fluent:** English

## CERTIFICATIONS

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### ALTERYX FOR FINANCIAL SERVICES

LinkedIn Learning

7/13/2024

[WWW.LINKEDIN.COM](#)

[Certificate](#)

### MLOPS ESSENTIALS: MODEL DEVELOPMENT AND INTEGRATION

LinkedIn Learning

7/8/2024

[WWW.LINKEDIN.COM](#)

[Certificate](#)

➤ Skills covered: Machine Learning, MLOps, AI

### HANDS-ON DATA SCIENCE USING SQL, TABLEAU, PYTHON AND SPARK

LinkedIn Learning

6/30/2024

[WWW.LINKEDIN.COM](#)

[Certificate](#)

### AI IN FINANCIAL SERVICES

Upstart Network

6/26/2024

[WWW.UPSTART.COM](#)

[Certificate](#)

➤ Understanding the use, limitations, benefits, and ethical considerations of AI in Finance

### DATASCIENCE BOOTCAMP

Erdős Institute

5/1/2024 and 5/1/2023

[WWW.ERDOSINSTITUTE.ORG/](#)

[Certificate](#)

➤ Project: Crime prediction in Tallahassee, FL using maps generated by pix2pix.

➤ Project: Predict initial configuration of Conway's Game of Life

[Certificate](#)

### MASTER TRAINER

Higher Education Commission

5/1/2023

[WWW.HEC.GOV.PK](#)

[Certificate](#)

➤ Faculty development training

## HONORS & AWARDS

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### DWIGHT B. GOODNER FELLOWSHIP

Spring 2023

Florida State University

Awarded an additional stipend for Fall 2022 in recognition of exceptional performance as a Teaching Assistant.

[Certificate](#)

### OUTSTANDING INSTRUCTOR AWARD

Fall 2022

Florida State University

Honored as one of the top instructors in the Math Department. [Certificate](#)

### AMS TRAVEL GRANT

Fall 2022

AMS

Awarded AMS travel grant to meet MRC mentor Valeria de Paiva to continue working on project developed at the MRC 2022.

### ACT MRC 2022

Summer 2022

AMS

Attended Mathematics Research Committee for Applied Category Theory. Worked under Valeria de Paiva's group on Dialectica Categories.

### ADELAIDE WILSON FELLOWSHIP

Fall 2018

Florida State University

Received a one-time monetary disbursement as an promising newly admitted graduate student.

**FULBRIGHT FELLOWSHIP**

2017 Cohort

Florida State University

Awarded a fully funded, five-year merit fellowship for my PhD, including a stipend, book allowance, and travel allowance. [Certificate](#)**MERIT SCHOLARSHIP**

Quaid-e-Azam University

Spring 2014

Tuition waiver for M.Phil.

**PRIME MINISTER'S LAPTOP**

Islamabad, Pakistan

Fall 2014

Awarded a laptop from Pakistan's Prime Minister for M.Phil. degree as an honors graduate student. [Certificate](#)**BEST TEACHER AWARD**

Fall 2014, Spring 2014, Spring 2016

CIIT, Virtual Campus

Top-rated teacher in all of Math Department. Received honorarium for performance. [Certificate](#)**PAKISTAN ATOMIC ENERGY COMMISSION TALENT SCHOLARSHIP**

2008 Cohort

Islamabad, Pakistan

Received a merit scholarship that fully covered all fees for my bachelor's degree, along with a stipend and book allowance.

**TALKS**Abstracts, slides and/or notes for the talks are available on my [webpage](#).**WEISFEILER AND LEHMAN CONSIDER SAMPLING**

8/25/2024

Blessings of Dimensionality

Zoom

Seminar Talk

**COLORING GRAPHS AND BEYOND**

4/15/2024

Haverford College

Pennsylvania, PA

Colloquium Talk

**FINDING CLIQUES WITHOUT FINDING CLIQUES**

4/12/2024

FSU Math Honors Day

Tallahassee, FL

Flash Talk

**WEISFEILER AND LEHMAN USE SIMPLICIAL SETS: PSEUDOTOP VERTEX NEURAL NETWORKS**

3/22/2024

49th ANYSRGMC

Syracuse, NY

Graduate Student Conference

**FINDING HIGHER STRUCTURES IN GRAPHS**

4/14/2023

Florida State University

Tallahassee, FL

Poster Presentation at Math Honors Day

**AN INTRODUCTION TO BELL'S THEOREM**

11/04/2022

LOV103, Florida State University

Tallahassee, FL

Graduate Student Seminar Talk

**INFINITE SIMPLICES: AN EXCURSION INTO SIMPLICIAL SETS**

8/19/2022

Florida State University

Tallahassee, FL

Public talk at Research Sharing Luncheon at Honors, Scholars and Fellows Society

**A COMBINATORIAL APPROACH TO SIMPLICIAL SETS**

8/11/2022

LOV103 Florida State University

Tallahassee, FL

Topology Seminar Talk

**AXIOMATIZATION OF DIFFERENTIAL COHOMOLOGY**

8/21/2021

Florida State University

Zoom

Algebra Seminar Talk

**THE VARIATIONAL BICOMPLEX AND TAKENS' THEOREM**

4/22/2020

**HILBERT'S SIXTH PROBLEM AND TOPOS THEORY**

LOV201, Florida State University  
Graduate Student Seminar Talk

3/12/2019

Tallahassee, FL

**COEXISTENCE OF SEVERAL NON-HERMITIAN OBSERVABLES IN PT-SYMMETRIC QM**

Delaware State University  
Presentation for a class project

4/23/2018

Dover, DE

**ORTHOMODULARITY AND INCOMPATIBILITY OF RELATIVITY AND QUANTUM MECHANICS**

International Islamic University  
3rd National Conference on Mathematical Physics

3/27/2017

Islamabad, Pakistan

**MATHEMATICS AND THE FORMALISM OF QUANTUM MECHANICS**

Quaid-e-Azam University  
Pure Math Seminar Talk

12/03/2015

Islamabad, Pakistan

**MATHEMATICS AND THE FORMALISM OF QUANTUM MECHANICS**

COMSATS Institute of Information Technology, Virtual Campus  
Math Seminar Talk

8/12/2015

Islamabad, Pakistan

**ALEXANDER GROTHENDIECK: THE MAN**

COMSATS Institute of Information Technology, Virtual Campus  
General Seminar Talk

3/12/2015

Islamabad, Pakistan

**1, 2,...**

COMSATS Institute of Information Technology, Virtual Campus  
Math Seminar Talk

8/24/2014

Islamabad, Pakistan

**FIXED POINT THEOREMS IN TOPOLOGY: APPLICATIONS**

COMSATS Institute of Information Technology, Virtual Campus  
Math Seminar Talk

8/17/2014

Islamabad, Pakistan

**THE COUNTER-INTUITIVE APPLICATIONS OF HARMONIC SERIES**

COMSATS Institute of Information Technology, Virtual Campus  
Math Seminar Talk

1/1/2014

Islamabad, Pakistan

**WHY INTUITIONISTIC LOGIC IS DE-CONSTRUCTIVE**

COMSATS Institute of Information Technology, Virtual Campus  
Math Seminar Talk

11/22/2013

Islamabad, Pakistan

**ENGINEERING DEUTSCH-JOZSA ALGORITHM WITH FLYING ATOMS**

International Conference and Workshop on Nanoscience and Technology 2012  
Conference Talk

8/4/2012

Islamabad, Pakistan

**LIMITS AND RANDOMNESS OF REASON**

COMSATS Institute of Information Technology  
Undergraduate Seminar Talk

8/17/2011

Islamabad, Pakistan

## SERVICE AND OUTREACH

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**JURY**

International Tournament for Young Mathematicians  
Volunteered for tournament's jury duty

December 2024

[WWW.ITYM.ORG](http://WWW.ITYM.ORG)

**READING GROUP**

Florida State University  
Initiated and organized a weekly reading group on Applied Category Theory by arranging speakers and talk titles

Spring 2023 – Spring 2024

Tallahassee, FL

**ADVISOR**

Fall 2022

**Student Advisory Board**

Volunteered on a student advisory board for the Honors, Scholars and Fellows Society at Florida State University.

Tallahassee, FL

**JUDGE****Capital Regional Science and Engineering Fair**

Volunteered as a judge for a statewide schools' Science Fair.

**February 1, 2019**

Tallahassee, FL

**VOLUNTEER****Research Sharing Luncheon**

Volunteered for logistics support for Research Sharing Luncheon, organized by Honors, Scholars and Fellows Society at FSU.

**September 13, 2019**

Tallahassee, FL

**VOLUNTEER****Pakistan Day**

Volunteered as a waiter, serving Pakistani cuisine on Coffee Hour, part of a weekly event that celebrates one country's cuisine per week at Center for Global Education, FSU.

**November 30, 2018**

Tallahassee, FL

**VOLUNTEER****Math Fun Day**

Volunteered for a public outreach and education event by the Math Department.

**February 2, 2019 & February 1, 2020**

Tallahassee, FL

**GARDENING****The Spring Gardens**

Potted plants in a community vegetable garden as part of Fulbright Enrichment Seminar series.

**April 14, 2018**

Philedelphia, PA