BIOGRAPHICAL SKETCH

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NAME: Pinky, Lubna

eRA COMMONS USERNAME (credential, e.g., agency login): LUBNAPINKY

POSITION TITLE: Senior Research Associate

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE	Completion Date	FIELD OF STUDY
Khulna University of Engineering and Technology, Khulna, Bangladesh	B.S.	04/2010	Electrical and Electronics Engineering
Texas Christian University, Fort Worth, TX	M.S.	05/2016	Physics
Texas Christian University, Fort Worth, TX	Ph.D.	08/2018	Biophysics
University of Tennessee Health Science Center, Memphis, TN	Postdoctoral	10/2018-08/2021	Mathematical Modeling of Infectious Diseases/Biomedical Laboratory Research & Development
Eastern Virginia Medical School, Norfolk, VA	Senior Research Associate	09/2021-12/2022	Medical Modeling and Simulation, Digital Patient, Prostate Cancer
Meharry Medical College, Nashville, TN	Assistant Professor	01/2023-present	Biomedical Physics

A. Personal Statement

My current work is focused on developing a virtual platform of human health status based on multiscale modeling approach in order to provide personalized diagnosis and therapy selection. As a proof of concept, our pilot study is on the discovery of novel and robust non-invasive biomarker signatures for distinguishing prostate cancer patient risk groups utilizing proteomics data collected from prostate proximal fluids such as expressed prostatic secretion urine, Prostate-Specific Antigen levels and/or Gleason Score. Applying machine-learning approaches, we then aim to develop clinical predictive models for prostate cancer diagnosis and prognosis and build up an application prototype based on the models.

My PhD and postdoctoral research concentration was in the mathematical modeling of infectious viral diseases. I developed and analyzed mathematical models of respiratory viral infections to understand infection biology and virus kinetics. My particular interest was to know how viruses, like influenza, parainfluenza, respiratory syncytial virus, interact within a host as a single viral infection and during coinfections, and how two interacting viruses spread through population.

B. Positions and Honors

Past Positions
Aug 2013-Aug 2018   Teaching Assistant (laboratory instructor), Department of Physics and Astronomy, Texas Christian University (TCU)
Aug 2015-May 2016   Adjunct Faculty, Department of Physics and Astronomy, TCU
Oct 2017   Visiting Graduate Student, Department of Pediatrics, University of Tennessee Health Science Center (UTHSC)
    Supervisor: Dr. Amber M. Smith
Oct 2018-Aug 2021   Postdoctoral Fellow, Department of Pediatrics, UTHSC
    Supervisor: Dr. Amber M. Smith
Sept 2021-Dec 2022   Senior Research Associate, Health Professions, Eastern Virginia Medical School
    Supervisor: Dr. Donald C. Combs

Present Position

Jan 2023-   Assistant Professor of Biomedical Physics, School of Applied and Computational Science, Meharry medical College

Honors
Year	Honor
2013	Travel Grant for Graduate Level Studies, Bangladesh-Sweden Trust Fund
2014, 2018	Student Travel Award, Society for Industrial and Applied Mathematics (SIAM)
2014 - 2018	Graduate Student Travel Grant, Texas Christian University (TCU)
2016	Travel Grant, Dynamics Days
2017	Research Fund, College of Science and Engineering, TCU
2017	Travel Grant, Texas Applied Mathematics and Engineering Symposium
2017	Travel Grant, Immunobiology and Infection Subgroup, Society for Mathematical Biology (SMB)
2018	Outstanding Dissertation, University level, TCU
2018	Outstanding Dissertation, College of Science and Engineering, TCU
2018	Outstanding Dissertation, Department of Physics and Astronomy, TCU
2018	Research Fund (to attend a short course on Systems Biology at the University of California-Irvine), Department of Physics and Astronomy, TCU
2019	Landahl-Busenberg Travel Award, SMB
2019	Travel Grant (to attend Viral Dynamics Workshop, France), SMB
2020	Invited speaker at Mathematical Biology Seminar, Virginia Tech
2020	Invited speaker at PKPD Workshop, St. Jude Children's Research Hospital
2020	Invited speaker as the Scientist Spotlight at International Society of Pharmacometrics Webinar
2020	Invited speaker at Immunobiology and Infection Subgroup, SMB Annual Meeting
2021	Invited speaker at Laboratory for Systems Medicine, University of Florida Health
2021	Invited speaker at the Virtual Seminar on Multi-Scale Modeling of COVID-19, Frankfurt Institute for Advanced Studies, Germany
2021	Invited speaker at Schiffer Group, Modeling Seminar, Fred Hutchinson Cancer Research Center
2021	Invited speaker at Mini symposium on Multi-Scale Modeling of Viruses, SMB Annual Meeting
2022	Invited speaker at Mathematical Biology Seminar, Iowa State University

Other Experience and Professional Memberships
Year	Membership
2013 - 2018	Member, American Physical Society
2014 -	Member, Society for Industrial and Applied Mathematics
2017 -	Member, Society for Mathematical Biology

2018 - 2021	Member, National Postdoctoral Association
2017 -	Journal Referee (Mathematical Bioscience, PLoS One, Bioinformatics, Annual Review in Control Theory, Frontiers in Microbiology, Computer Methods and Programs in Biomedicine, Bulletin of Mathematical Biology)
2020 - 2021	Guest Editor, Biology, MDPI

C. Contribution to Science

Several clinical studies revealed that as many as 20-30% of the patients hospitalized with influenza-like illness are coinfected with more than one virus and have enhanced, reduced or unaffected disease severity compared to single viral infections. However, it is not clear how unrelated viruses interact within a host and affect disease severity. In a complex multi-virus system, infection outcomes can be controlled by several host and viral factors such as the virus combinations, initial inoculums, timing of secondary infection, host-immune status. While testing all possible conditions is challenging in laboratory, mathematical models can be used to evaluate individual and combined effects of every condition. To investigate the dynamics underlying coinfection within a host and hence, to describe mechanisms of interaction among viruses and host cells, we developed a series of mathematical models based on both stochastic and deterministic approaches. Specifically, we used our models to investigate coinfections of two viruses with influenza virus, RSV, rhinovirus, human parainfluenza virus, human metapneumovirus and more recently with SARS-CoV-2. One of the primary results informed that during coinfections with two distinct viruses, one virus can block the growth of another simply by being the first to infect the available host cells. The work represents a first step in modeling respiratory viral coinfections. Our model predictions help elucidate the fundamental competition for resources that drives dynamics of respiratory coinfections, but there are many other factors that can change the competitive balance between the two viruses which are our future research direction.

1. Pinky L, Dobrovolny HM. Epidemiological consequences of viral interference: A mathematical modeling study of two interacting viruses. Frontiers in Microbiology. 2022 (accepted, in press)
2. Pinky L, Burke CW, Russell CJ, Smith AM. Quantifying dose-, strain-, and tissue-specific kinetics of parainfluenza virus infection. PLoS Comput Biol. 2021 Aug;17(8):e1009299. 2021 Aug. PubMed PMID: 34383757; PubMed Central PMCID: PMC8384156
3. Pinky L, Dobrovolny HM. SARS-CoV-2 coinfections: Could influenza and the common cold be beneficial?. J Med Virol. 2020 Nov;92(11):2623-2630. 2020 Jun 19. PubMed PMID: 32557776; PubMed Central PMCID: PMC7300957.
4. Pinky L, Gonzalez-Parra G, Dobrovolny HM. Effect of stochasticity on coinfection dynamics of respiratory viruses. BMC Bioinformatics. 2019 Apr 16;20(1):191. PubMed PMID: 30991939; PubMed Central PMCID: PMC6469119.
5. Pinky L, González-Parra G, Dobrovolny HM. Superinfection and cell regeneration can lead to chronic viral coinfections. J Theor Biol. 2019 Apr 7;466:24-38. PubMed PMID: 30639572; PubMed Central PMCID: PMC7094138.
6. Pinky L, Dobrovolny HM. The impact of cell regeneration on the dynamics of viral coinfection. Chaos. 2017 Jun;27(6):063109. PubMed PMID: 28679223.
7. Pinky L, Dobrovolny HM. Coinfections of the Respiratory Tract: Viral Competition for Resources. PLoS One. 2016;11(5):e0155589. PubMed PMID: 27196110; PubMed Central PMCID: PMC4873262.
8. Pinky L, Islam S, Alam M, Hossain M, Islam M. Modeling of orientation-dependent photoelastic constants in cubic crystal system. Materials Sciences and Applications. 2014 March; 5(4):223

Complete List in MyBibliography:

https://www.ncbi.nlm.nih.gov/myncbi/1p78sBPVt9i1xc/bibliography/public/