



York Emergency Mitigation, Engagement, Response, and Governance Institute (Y-EMERGE) Newsletter, August 2023

Y-EMERGE builds on York's exceptional expertise to develop, grow, and sustain transformative and multidisciplinary research and teaching in transformative disaster risk reduction, emergency preparedness, response, and recovery. Y-EMERGE brings together a wide variety of disciplines, including mathematical modelling, social and behavioural study, geospatial technology, artificial intelligence, participatory research, and the humanities and social sciences. Y-EMERGE fosters strong relationships with governmental agencies, stakeholders, and communities beyond the campus, emphasizing research and training opportunities that contribute to community and organizational resilience.

Our newsletter aims to share some of this incredible work and provide updates to the Y-EMERGE Community.

[Visit our website](#) to learn more about the research that is done at Y-EMERGE.



1 - Director's Message

- Y-EMERGE is created to leverage and furthering York University's institutional capacity and its global collaborative network to develop and coordinate transformative and integrative research; foster strong networks of researchers, trainees, and practitioners; develop a robust agenda for funding research and practice; and advance disaster and emergency knowledge translation activities to meet the urgent need to transform thinking, policy, and practice in disaster and emergencies for a more resilient and healthy communities in Canada and globally. - Professor Jianhong Wu

Director Y-Emerge

Recent Events: Emerging & Systemic Risks Monthly Lectures



Recently the following events were hosted through Y-EMERGE:



Title of the talk: Coordinating Ontario's Poultry Industry's Response to Disease through Preparedness and Prevention

We hosted Emerging & Systemic Risks Monthly Lectures Talk #9 on Thursday, July 20, 2023. Speaker Maggy Watson is the Operations Lead, Feather Board Command Centre (FBCC).

On July 20, 2023, Maggy Watson, the Operations Lead, Feather Board Command Centre (FBCC) talked about Coordinating Ontario's Poultry Industry's Response to Infectious Disease through Preparedness and Prevention in the Emerging and Systemic Risks Monthly Lecture Series. She started with an acknowledgement of working with skilled and resourceful people. Then she introduced the Feather Board Command Centre as a collaborative effort between Ontario's four poultry marketing boards. In Ontario they have the chicken farmers of Ontario, the egg farmers, Ontario Broiler Hodging Egg Chick Commission and then the Turkey Farmersville, ON.

Then she talked about the hazards for farmed animal disease. Federally Reportable Diseases (CFIA) and Ontario Provincially Notifiable Hazards (OMAFRA) has a huge list of hazards from which FBCC only takes care of Avian Influenza, Fowl typhoid, Newcastle disease under CFIA and Avian encephalomyelitis, Avian Infectious Laryngotracheitis, Avian mycoplasmosis under OMAFRA.

Further Maggy said "There are 3 responders for animal disease or the poultry industry Federal, provincial and territorial. We have two levels of government. Agriculture and food Canada, Health Canada. Of

course, we're talking about infectious things. So, they become evolved because there's all kinds of wild birds now ministry of environment conservation and park stuff for Ontario."

And on the industry side they have their marketing boards, the poultry service support sector and the other businesses and organizations that are going on around the farms that help get the products to the grocery store. And then, of course, the big, important one, the heart of the industry, which is farmers. FBCC is here to integrate the industry side into that government side.

Then Maggy shared the time layer formation of FBCC.

Maggy said, "we do preparedness training and exercises which helps us to get to that that stage of integration. So, we have all of the stuff from the feather boards, we train them incident management system beforehand.

For prevention the farmer needs to maintain bio security standard. Bio Security are tangible or intangible security measures and steps that are taken to prevent the introduction of any type of hazard that may introduce the spread of an infection into a protected population of animals. Bio Security standard are the key to prevention and limitation of disease spread. The marketing board require quota holding farmers to maintain strict bio security standards on their farm. And those video programs are included in annual inspection events. So, that kind of bio security standards are all the time run at the mills. And then they also have tightened bio security protocol for province as a whole, or for a specific area.

Another major part of response is how our integration works, Maggy said. We're going to talk about training of IMS. This is our general BCCIMS structure. The reason we love IMS in this type of area is very scalable and modular. Incursions of disease have been required different levels of response. This whole structure, if it's a smaller face in AA secluded area we have a emergency response plan that we share with the Ontario Animal Health Network. That's something that we are able to carry out pretty routinely. We may not have to stop this whole plan for you. We are able to only roll out the sections we need. We need basic incident management system. However, if we have something that's a little bit more complex, such as the highly pathogenic alien influenza response, then we may carry out all of these roles and responsibilities in here.

Highly pathogenic influenza in 2022 and 2023 definitely can be used as a complex response category. They had 39 staff from all four of the feather boards that were responding. Some were related to troubleshooting and support for the farmers and the industry.

Lastly, another response area that the key farmers start to use or continue to use technology a lot more in forming their bird health decisions.

Moderator Dr Carly Rozins asked many questions along with the below ones:

If there is an outbreak on a quota holding farm versus a non quota holding farm, do you think the procedure is similar like with their tests go to the same facility?



Maggy said all the tests do go ultimately to the same lab. So, they're all under the same.

Then Dr. Carly asked to what extend the bio security needed?

Maggy's ended up the discussion by the below comment:

Bio security is the only prevention. The industry was to focus on how we can try to manage wildlife and the birds' interactions with wildlife. Bio security is one of those ways, because that's how we keep the birds that they're farming away from the wildlife. You can watch the full webinar through the below link: <https://www.yorku.ca/research/yemerge/lectures/>


2023 LIAM-NSERC/Mitacs/Sanofi Alliance Summer Symposium Series
Dynamical Systems with Applications

2023 LIAM-NSERC/Mitacs/Sanofi Alliance Summer Symposium Series
Dynamical Systems with Applications

Lecture # 1

What has biology done for mathematics: success stories

Lecture By

Professor Messoud Efenidiye

Professor Efenidiye received Diplom (thesis) and Ph.D. in Moscow Lomonosov State University. - Habilitation in Germany, Free University Berlin. He is an Amsterdam citizen living and working permanently in Germany as a professor for more than 32 years and the first Hungarian scientist who received both the Alexander von Humboldt Fellowship (1990) and Alexander von Humboldt Fellowship for experienced researchers (2018).

He has published 8 books in the leading publishers of the world both in pure and applied mathematics, including: Springer, the Fields Institute, Birkhäuser, American Mathematical Society, Alms, as well as Galstsch, in addition to the Alexander von Humboldt award, he was awarded Japan Society Promotion of Science-2006; Otto Meisinger Award (Germany) 2009; Oswald Stillegold Medal Visiting Professor 2018; a joint project of Fields Institute and University of Toronto; James G. Thompson Distinguished Professor 2019/2020; University of Waterloo; and the Fector's Distinguished Professor at Marquette University, Istanbul, he became a fellow of the Fields Institute in 2023.




He has made fundamental contributions in the following fields: Topological Methods, Complex Analysis, Global Nonlinear Analysis, Infinite Dimensional Dynamical Systems, Mathematical Biology, and Mathematical Medicine.



Abstract

What has biology done for mathematics? As usual to affirmative answer such questions one has to present success stories. During the talk, I will present some realistic bio/medical models that lead to a new class of degenerate parabolic type systems analysis of which, as well as the long-time dynamics of their solutions in terms of attractors is not well-understood. These bio/medical models create several new topics in mathematics, in particular: infinite dimensional attractors with polynomial asymptotics of their Kolmogorov entropy. Other open questions will also be considered.

2:30-3:30pm, August 02
Refreshment provided after the lecture

Kinsmen Building: Room 277
 York University, Keele campus
Organizer: Jianhong Wu, Judy Kong, Woldegebriel Assefa Woldegerima






2023 LIAM-NSERC/Mitacs/Sanofi Alliance Summer Symposium Series
Dynamical Systems with Applications

Lecture # 2

Spatiotemporal Dynamics in Epidemic Models with Levy Flights: A Fractional Diffusion Approach

Lecture By

Professor Shigui Ruan




Dr. Shigui Ruan received Ph.D. in Applied Mathematics from the University of Alberta in 1992. He was a Junior Fellow at the Fields Institute for Research in Mathematical Sciences in 1992-1993 and a Post-doctoral Fellow at McMaster University in 1993-1994. After being an Assistant and Associate Professor at Dalhousie University from 1994 to 2002, he joined the Department of Mathematics at the University of Miami in 2002 where he is now a Full Professor and Cooper Fellow. He is interested in Differential Equations, Dynamical Systems, and Mathematical Biology and published over 200 papers in both scientific and mathematical journals including PNAS, Lancet Infect Dis, Memoirs Amer Math Soc, Trans Amer Math Soc, SIAM J Math Anal, SIAM J Appl Math, J Differential Equations, J Funct Anal, J Math Pure Appl, Math Ann, etc. His research has been supported by the NSERC, NIH, NSF, CDC, and NNSFC. He was a Thomson Reuters Highly Cited Researcher in 2014 and 2015. He serves on the editorial boards of several journals including the Bulletin of Mathematical Biology, Infectious Disease Modelling, Journal of Mathematical Biology, Mathematical Biosciences, Nonlinear Analysis - Real World Applications, etc.



Abstract

Recent field and experimental studies show that mobility patterns for humans exhibit scale-free temporal dynamics with heavy-tailed distributions characterized by Levy flights. To study the long-range geographical spread of infectious diseases, in this paper we propose a susceptible-infectious-susceptible epidemic model with Levy flights in which the dispersal of susceptible and infectious individuals follows a heavy-tailed jump distribution. Owing to the fractional diffusion described by a special fractional Neuman-Laplacean, the fractional diffusion model can be used to address the spatiotemporal dynamics driven by the medical dispersal. The primary focuses are on the existence and stability of disease-free and endemic equilibria and the impact of dispersal rate and fractional power on spatial profiles of these equilibria. A variational characterization of the basic reproduction number R_0 related to its dependence on the dispersal rate and fractional power is also examined. Then R_0 is utilized to investigate the effects of spatial heterogeneity on the transmission dynamics. It is shown that R_0 serves as a threshold for determining the existence and maintenance of an epidemic equilibrium as well as the stability of the disease-free and endemic equilibria. In particular, for low-risk regions, both the dispersal rate and fractional power play a critical role and are capable of altering the threshold value. Numerical simulations were performed to illustrate the theoretical results. (Ruan and Li, Discrete Contin. Math. 2021)

10:30-12:30pm, August 11
Refreshment provided before the lecture

Kinsmen Building: Room 277
 York University, Keele campus
Organizer: Jianhong Wu, Judy Kong, Woldegebriel Assefa Woldegerima






2023 LIAM-NSERC/Mitacs/Sanofi Alliance Summer Symposium Series
Dynamical Systems with Applications

Lecture # 3

A Differential Equation with a State-Dependent Queueing Delay

Lecture By

Professor Tibor Krisztin




Tibor Krisztin is a Hungarian mathematician, received his MSc degree in mathematics at the University of Szeged in 1981, the DSc (Doctor of Science) degree from the Hungarian Academy of Sciences in 2000. He is a professor of the Bolyai Institute of the University of Szeged, Hungary. He was (and is) a member of the editorial board of several international journal, including J. Math. Anal. Appl., SIAM J. Math. Anal., co-editor-in-chief of the Electronic Journal of Qualitative Theory of Differential Equations. He is a member of the Hungarian Academy of Sciences (2019). His research area is infinite dimensional dynamical systems, delay differential equations, published more than 70 research papers. He received several prizes, including the 2016 Moore Prize for the application of interval analysis, the Szechenyi Prize from the Hungarian State (2018).

Abstract

We consider a differential equation with a state-dependent delay motivated by a queueing process. The time delay is determined by an algebraic equation involving the length of the queue for which a discontinuous differential equation holds. The new type of state-dependent delay raises some problems that are studied in this talk. We formulate an appropriate framework to handle the system, and show that the solutions define a Lipschitz continuous semiflow in the phase space. The second main result guarantees the existence of slowly oscillating periodic solutions.

10:30-12:30pm, August 11
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Latest News!



- July 31, 2023- [Modeling the impact of a high-uptake bivalent booster scenario on the COVID-19 burden and healthcare costs in New York City](#) by Abhishek Pandey a g, Meagan C. Fitzpatrick a b g, Seyed M. Moghadas c g, Thomas N. Vilches a c g, Charles Ko d, Ashwin Vasani e f, Alison P. Galvani a
- July 22, 2023- [Bayelsa panel fingers IOCs, regulators in state's oil pollution tragedy](#) York YEMERGE Member Anna Zalik was mentioned in *Punch Nigeria* July 22
- July 19, 2023- [Will Ontario's 'clean' battery storage be powered by a fossil fuel?](#) Mark Winfield, YEMERGE Member at York University, was quoted in *Corporate Knights*
- July 18, 2023- [New Lassonde facility explores how climate impacts infrastructure](#)
- July 16, 2023- [INSIDE THE VILLAGE: When forest fires rage out of control](#) Eric Kennedy, a professor of disaster and emergency management at York University, was quoted in *Innisfil*
- July 15, 2023- [Survey studies emotional toll of disasters two years after Barrie tornado](#) Jennifer Spinney, an assistant professor in disaster and emergency management at York University, was quoted in *CTV News* July 15
- July 15, 2023- [BARRIE TORNADO RECOVERY PROJECT: TWO YEARS AFTER THE STORM](#) Research by Jennifer Spinney
- July 13, 2023- [Jennifer Spinney, the Y-EMERGE member, was featured in Barrie 360 on July 13.](#)
- July 12, 2023- [EXCLUSIVE: Big Batteries Likely Powered by High-Emitting Gas Under Ontario Grid Plan](#)
- July 12, 2023- [Ontario's Energy Expansion Goes Heavy on Nuclear](#)

- July 10, 2023- ['A place where people come together': York University students developing climate solutions at Penetanguishene ecology garden](#)
- July 8, 2023 - [Child Protection Services and Youth Experiencing Homelessness: Findings of the 2019 National Youth Homelessness Survey in Canada](#)July
- 7, 2023- [10 Years Since the Toronto Flood of 2013](#)
- July 6, 2023 - [A combination of social, organizational and technical factors caused the Titan's implosion](#)
- July 4, 2023 - [Climate Change Adaptation Program](#)
- July 4, 2023 - ['A Preoccupation With Failure.' Why the Titan Submersible Was Doomed From the Start](#)
- July 4, 2023 - [Multiple warnings about Titan submersible were ignored](#)

For regular updates, please keep your eyes on the latest news of Y-EMERGE by using the below link:

<https://www.yorku.ca/research/yemerge/latest-news/>

Awards!



- June 20, 2023 - [Professor Cary Wu Earns Sociology Research Award](#)



2 - Follow Us On Social Media:

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- YouTube: @yorkemerge

For any further update or information feel free to contact us!



Y-EMERGE

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