Yuxin Jia, Tina

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Education

Imperial College London, Ph.D., ***London, United Kingdom*** **Oct 2023 - Oct 2027(Expected)**

Research Topic: Microswimmer in viscous environment with targeting drug delivery system for cancer treatment.

Primary Supervisor: Dr. Thibault Bertrand

University of Oxford, M.M., ***Oxford, United Kingdom*** **Aug 2022 - Sep 2023**

Major: Mathematic Modelling and Scientific Computing.

Courses: Applied Partial Differential Equations, Viscous flow, Numerical Solution of Partial Differential Equations comprising Continuous Optimization, Mathematical Physiology & Biology, Finite Element Methods for PDEs

University of Waterloo, B.M. ***Waterloo, Canada*** **Sep 2018 - May 2022**

Major: Applied Mathematics | **GPA: 90.07%**

Courses: Partial Differential Equations (98%), Computational Methods for Partial Differential Equations (92%), Calculus of Variations (95%), Control Theory (94%), Introduction to Dynamical Systems(95%)

Publications

- V.A Karatayev, E White, **Y.X Jia.,** C.T Bauch, M Anand, *"Trade-offs in ecological resilience can require managing human impacts outside natural reserves"* ***(To be submitted to bioRxiv)***
- Lu, L., Bai, S., Shi, J., Zhang, Z. and **Y.X Jia**, et.al (2024). Bacteria Flagella-Mimicking Polymer Multilayer Magnetic Microrobots. Chemical Engineering Journal. (Under review).
- **Y.X Jia.**, et al. (2024). Doc2Flow: Industrial Processes with LLMs-Driven Flowchart Synthesis from long descriptive Texts. The 27th European conference on Artificial intelligence (Under review)
- **Y.X Jia.** (May. 2023). "*Mathematical Model of Avascular Tumor Growth: Necrosis and Apoptosis.*" *BIO Web Conf.*, Vol. 59. Proceedings of the 2023 5th International Conference on Biotechnology and Biomedicine (ICBB 2023), Clinical Trials and Medical Device Monitoring Section. DOI: 10.1051/bioconf/20235903009.
- **Y.X Jia.** (Jun. 2023). "*Review in Mathematic Models of Hydrodynamic Micro-swimmer in Low Reynold Environment.*" *Proc. SPIE*, Vol. 12725. Proceedings of the International Conference on Pure, Applied, and Computational Mathematics (PACM 2023). DOI: 10.1117/12.2679144.
- L.X Yuan, **Y.X Jia***. (Jan.2023). "*Studies on Financial Center Selection Using Spatial Statistical Analysis and Combination Evaluation*." Proceedings of the 2nd International Conference on Business Management, Economic Analysis and Information Technology *(BDEDM 2023)*, Changsha, China. DOI: 10.4108/eai.6-1-2023.2330316.

Work Experience

Natural Language Processing Engineer | Yigu Technology **Jul 2023 - Apr 2024**

Supervisor: Xiang (Chris) Lee. **Shanghai, China**

- Optimized NLP models like BERT and LSTM for an e-commerce chatbot and increasing user engagement by 40%.
- Managed preprocessing and analysis of large datasets, employing advanced techniques such as tokenization and lemmatization to improve data quality for machine learning applications.
- Collaborated across teams to integrate NLP solutions, staying updated with industry trends and contributing to research and development to drive continuous innovation.

Data Analyst | Huawei Technologies Canada Co., Ltd, **Jan 2022 - Aug 2022**

Supervisor: Chunfang (Ariel) Jia. **Waterloo, Canada**

- Pasteurized data mining, testing, and augmentation of the Python and pandas scripts
- Facilitated industry insights analysis and compiled and assessed corporate and industry data in reports.
- Leveraged data analysis, timely uncovered and compiled useful information, supported management and decision-making for business, and produced essential analysis ideas.

Research Assistant | University of Waterloo **Jul 2021- Jan 2022**

Supervisor: Dr.Henry Shum **Waterloo, Canada**

- Reviewed research on particle motion in low Reynolds number fluid flow and summarized mathematical models for the tiniest swimmers. (**Modelling Chemotactic Responses of Robotic Microswimmer)**
- Developed MATLAB algorithm for the calculation of driven particle trajectories in Stokes flow.
- Constructed plots and investigated active particle motion control prior drafting research report on model and findings.
- Developed MATLAB code to compute the trajectories of propelled particles in a Stokes flow.

Research Assistant | University of Toronto **Apr 2021- Jul 2021**
Supervisor: Dr. Israel Sigal **Toronto, Canada**

- Involved in the project *"Pulse Propagation in axons"* through participating in the collection and review of literature for theresearch project, and undertook model comparison based on literature review conclusions.
- Evaluated Hodkin's-Huxley and FitzHugh-Nagumo (FHN) equations based on prior comparative and literature studies.
- Designed and executed the simulation of FHN equations.

Research Assistant | University of Guelph **Jan 2021- Apr 2021**
Supervisor: Dr. Vadim Karatayev **Guelph, Canada**

- Committed in the project *"Trade-offs in ecological resilience with human impacts | R-language"* and simulated stochastic, spatially structured differential equation models with a variety of attractors to determine managementtactics that increase the likelihood of socioeconomically acceptable ecological regimes.
- Performed analysis to lessen the likelihood of other stable states.
- Designed in R using a 2-patch version model that incorporates temporal variables and human behaviour.

Research Projects

Repeatable Snap-Through Mechanism for a Jumping Robot | Matlab **Jun 2023 – Sep 2023**
University of Oxford

- Conducted rigorous mathematical analysis to understand the mechanics of snap-through phenomena in elastic structures.
- Utilized a pre-existing mathematical model to simulate various loading conditions, focusing on the conditions that lead to snap-through events. Find the region of values of control variables where the multiple snap-through occur.
- Employed numerical methods to solve non-linear differential equations, providing insights into the system's stability and bifurcation points.
- Analysed the energy landscape to identify the conditions under which snap-through occurs, thereby informing the design parameters for a jumping robot.
- Collaborated with a multidisciplinary team to integrate the mathematical findings into the mechanical design of the robot.

Optimal Control Formulation of Deep Neural Network | R-language **Sep 2021 – Jan 2022**
University of Waterloo

- Established several discrete Patterson's maximum principal evaluations for the Deep Neutral Network (DNN) optimum controller design.
- Verified the convexity of regularizes in residual networks and the smoothness criterion for activation functions. Employed TensorFlow to implement the DNN model and examine whether the accuracy requirements areinfluenced by smoothness.

Species heterogeneity in food webs | R-language **Jan 2021 – May 2021**
University of Guelph

- Performed analysis for minimizing the likelihood of alternate stable states, programmed in R, 2-patch version model, with human actions and time factors considered.
- Deduced management plans that optimize the likelihood of socioeconomically beneficial environmental regimes by running spatial and temporal simulations and analyzing stochastic, spatially structured differential equation models with various attractors.
- Revealed the optimal management practices for giant kelp forests include marine protected areas as natural reserves and adaptive fishing management outside of reserves to prevent stochastically triggered, irreversible collapse of kelp forest ecosystems.

MRI and other applications | R-language Python **Aug 2020 – Dec 2020**
University of Waterloo

- Constructed electrostatic potentials and nerve impulses.
- Mapped graphical results using Python after analyzing an MRI scanner with a database.
- Demonstrated simulations of chemical processes and electrostatic potential interaction.

Honorary Mentions and Awards

UKRI Engineering and Physical Sciences Research Council Funding (EPSRC) **2023-2027**
Imperial College London and UK Government

Dean's Honor List (Distinct graduation) **2018 - 2022**
University of Waterloo

Mathematics Undergraduate Research Award **2021**
Natural Sciences and Engineering Research Council of Canada

President's Research Award **2021**
University of Waterloo

President's Scholarship of Distinction **2018**
University of Waterloo

Miscellaneous

- **Language**: English (Fluent), Mandarin (Native), French (Basic)
- **Computer skills**: Python, Maple, MATLAB, Dr.Racket, HTML/CSS, R, Maple