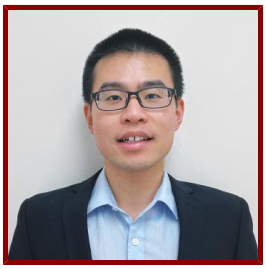
Stanford



Xiaoxu Zhong

Postdoctoral Scholar, Radiation Physics

Bio

BIO

I am a Postdoctoral Fellow in the Guillem Pratx Lab, with an expertise in predictive modeling, algorithm development, and data science. I earned my Bachelor of Science and Master of Science degrees in Ocean Engineering from Shanghai Jiao Tong University. I then received a Ph.D. in Mechanical Engineering from Purdue University, where I focused on developing mathematical models and applying machine learning. My work uncovered the mechanisms behind autoinjectors, drug delivery, and cavitation bubbles, with applications in tumor treatment and the design of medical devices. Currently, I am combining computational modeling and experimental approaches to positron emission tomography imaging, aiming to improve tumor diagnosis and treatment. I am also investigating how ionizing radiation nucleates nano-sized bubbles.

HONORS AND AWARDS

- Full Membership, Sigma Xi (2025)

PROFESSIONAL EDUCATION

- Ph.D., Purdue University , Mechanical Engineering (2023)
- M.S., Shanghai Jiao Tong University , Ocean Engineering (2018)
- B.S., Shanghai Jiao Tong University , Ocean Engineering (2015)

STANFORD ADVISORS

- Guillem Pratx, Postdoctoral Faculty Sponsor

LINKS

- Google Scholar: https://scholar.google.com/citations?user=9NrOkkgAAAAJ&hl=en&oi=ao

Research & Scholarship

LAB AFFILIATIONS

- Guillem Pratx, Physical Oncology Lab (8/15/2023)

Publications

PUBLICATIONS

- **A microscopic computational simulation of [18F]FDG transport and metabolism identifies valid regimes for compartmental analysis.** *Physics in medicine and biology*
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- **Diffusion-aware compartment model of the cellular uptake of ^{18}F-fluorodeoxyglucose.** *Physical review. E*
  Zhong, X., Nguyen, H. T., Takematsu, E., Pratx, G.
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- **Spatial transcriptomic analysis drives PET imaging of tight junction protein expression in pancreatic cancer theranostics.** *Nature communications*
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- **Efficient radiolabeling of mesoporous silica nanoparticles for single-cell PET imaging.** *European journal of nuclear medicine and molecular imaging*
  Khan, S., Zhong, X., Das, N., Yu, J. H., Natarajan, A., Anders, D., Pratx, G.
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- **The role of initial lymphatics in the absorption of monoclonal antibodies after subcutaneous injection.** *Computers in biology and medicine*
  Rahimi, E., Li, C., Zhong, X., Shi, G. H., Ardekani, A. M.
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- **A multi-scale numerical study of monoclonal antibodies uptake by initial lymphatics after subcutaneous injection.** *International journal of pharmaceutics*
  Li, C., Zhong, X., Rahimi, E., Ardekani, A. M.
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- **Ultrasensitive and multiplexed tracking of single cells using whole-body PET/CT.** *Science advances*
  Nguyen, H. T., Das, N., Ricks, M., Zhong, X., Takematsu, E., Wang, Y., Ruvalcaba, C., Mehadji, B., Roncali, E., Chan, C. K., Pratx, G.
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- **A compartment model for subcutaneous injection of monoclonal antibodies.** *International journal of pharmaceutics*
  Zhong, X., Liu, Y., Ardekani, A. M.
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- **Numerical studies of the lymphatic uptake rate.** *Computers in biology and medicine*
  Li, C., Zhong, X., Ardekani, A. M.
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- **Accurate solutions of a thin rectangular plate deflection under large uniform loading** *APPLIED MATHEMATICAL MODELLING*
  Liu, L., Zhong, X., Liao, S.
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- **Hydrodynamic considerations for spring-driven autoinjector design** *INTERNATIONAL JOURNAL OF PHARMACEUTICS*
  Zhong, X., Veilleux, J., Shi, G., Collins, D. S., Vlachos, P., Ardekani, A. M.
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- **Optimizing autoinjector devices using physics-based simulations and Gaussian processes** *JOURNAL OF THE MECHANICAL BEHAVIOR OF BIOMEDICAL MATERIALS*
  Sree, V., Zhong, X., Bilionis, I., Ardekani, A., Tepole, A.
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- **The role of liquid rheological properties on the injection process of a spring-driven autoinjector** *INTERNATIONAL JOURNAL OF PHARMACEUTICS*
  Zhong, X., Mitra, H., Veilleux, J., Simmons, E., Shi, G., Ardekani, A. M.
  2022; 628: 122296
- **A framework to optimize spring-driven autoinjectors** *INTERNATIONAL JOURNAL OF PHARMACEUTICS*
  Zhong, X., Bilionis, I., Ardekani, A. M.
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- **A model for bubble dynamics in a protein solution** *JOURNAL OF FLUID MECHANICS*
  Zhong, X., Ardekani, A. M. M.

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- **An experimentally validated dynamic model for spring-driven autoinjectors** *INTERNATIONAL JOURNAL OF PHARMACEUTICS*
  Zhong, X., Guo, T., Vlachos, P., Veilleux, J., Shi, G., Collins, D. S., Ardekani, A. M.
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- **A model for a laser-induced cavitation bubble** *INTERNATIONAL JOURNAL OF MULTIPHASE FLOW*
  Zhong, X., Eshraghi, J., Vlachos, P., Dabiri, S., Ardekani, A. M.
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- **Analytic solutions of the rise dynamics of liquid in a vertical cylindrical capillary** *EUROPEAN JOURNAL OF MECHANICS B-FLUIDS*
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- **On the limiting Stokes wave of extreme height in arbitrary water depth** *JOURNAL OF FLUID MECHANICS*
  Zhong, X., Liao, S.
  2018; 843: 653-679
- **Analytic approximations of Von Karman plate under arbitrary uniform pressure-equations in integral form** *SCIENCE CHINA-PHYSICS MECHANICS & ASTRONOMY*
  Zhong, X., Liao, S.
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- **On the homotopy analysis method for backward/forward-backward stochastic differential equations** *NUMERICAL ALGORITHMS*
  Zhong, X., Liao, S.
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- **Analytic Solutions of Von Karman Plate under Arbitrary Uniform Pressure - Equations in Differential Form** *STUDIES IN APPLIED MATHEMATICS*
  Zhong, X. X., Liao, S. J.
  2017; 138 (4): 371-400