BIOGRAPHICAL SKETCH

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NAME: Qian, Xiaoning

eRA COMMONS USER NAME (credential, e.g., agency login): xiaoning.qian

POSITION TITLE: Professor

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 (if applicable)	END DATE MM/YYYY	FIELD OF STUDY
Shanghai Jiao-Tong University, Shanghai	BENG	06/1997	Electronic Engineering
Shanghai Jiao-Tong University, Shanghai	MENG	05/1999	Electronic Engineering
Yale University, New Haven, Connecticut	MPHIL	05/2003	Electrical Engineering
Yale University, New Haven, Connecticut	MS	05/2003	Electrical Engineering
Yale University, New Haven, Connecticut	PHD	12/2005	Electrical Engineering
Yale School of Medicine, New Haven, Connecticut	Postdoctoral Fellow	06/2007	Medical Imaging
Texas A&M University, College Station, TX	NIH training grant	07/2009	Bioinformatics

A. Personal Statement

My current research interests focus on developing mathematical models and computational methods to systematically analyze large-scale multi-modal biomedical data and systems. I have been actively studying probabilistic graphical models, Bayesian methods, dynamic modeling, robust optimization, machine learning (ML), content-based data indexing and retrieval, and their applications in systematic analysis of biomedical data and systems, including images, gene expressions, molecular sequences and networks. My expertise in AI/ML, optimization, statistical programming, complex system modeling, content-based data indexing and retrieval, and bioinformatics may help develop predictive and generative AI models as well as bioinformatics data analysis and optimal experimental design under uncertainty for our ultimate goal of improving health outcomes.

1. Cabello AL, Wells K, Peng W, Feng HQ, Wang J, Meyer DF, Noroy C, Zhao ES, Zhang H, Li X, Chang H, Gomez G, Mao Y, Patrick KL, Watson RO, Russell WK, Yu A, Zhong J, Guo F, Li M, Zhou M, Qian X, Kobayashi KS, Song J, Panthee S, Mechref Y, Ficht TA, Qin QM, de Figueiredo P. Brucella-driven host N-glycome remodeling controls infection. Cell Host Microbe. 2024 Apr 10;32(4):588-605.e9. PubMed PMID: 38531364.

2. Woo HM, Qian X, Tan L, Jha S, Alexander FJ, Dougherty ER, Yoon BJ. Optimal decision-making in high-throughput virtual screening pipelines. Patterns (N Y). 2023 Nov 10;4(11):100875. PubMed Central PMCID: PMC10682755.

3. Fu C, Yan K, Wang L, Au W, McThrow , Komikado T, Maruhashi K, Uchino K, Qian X, Ji S. A Latent Diffusion Model for Protein Structure Generation. the Second Learning on Graphs Conference (LoG). 2023.

4. Hasanzadeh A, Hajiramezanali E, Duffield N, Qian X. MoReL: Multi-omics Relational Learning. The 10th International Conference on Learning Representations (ICLR 2022). 2022 April.

B. Positions, Scientific Appointments and Honors

Positions and Scientific Appointments

2022 -	Professor, Department of Electrical & Computer Engineering, Texas A&M University, College Station, TX
2021 -	Joint Appointment, Computational Science Initiatives, Brookhaven National Laboratory, Upton, NY
2020 -	Adjoint Professor, Department of Computer Science & Engineering, Texas A&M University, College Station, TX
2018 - 2022	Associate Professor, Department of Electrical & Computer Engineering, Texas A&M University, College Station, TX
2013 - 2021	Associated faculty, Texas A&M Engineering Experiment Station (TEES)-AgriLife Center for Bioinformatics & Genomic Systems Engineering (CBGSE), Center for Translational Environmental Health Research (CTEHR), Texas A&M University, College Station, TX
2013 - 2018	Assistant professor, Department of Electrical & Computer Engineering, Texas A&M University, College Station, TX
2009 - 2013	Assistant professor, Department of Computer Science & Engineering, University of South Florida, Tampa, FL

Honors

2025 - 2029	Segers Family Dean's Excellence Professorship II, Texas A&M University
2024 - 2026	Faculty Impact Fellow, Department of Electrical & Computer Engineering, Texas A&M University
2024	TEES (Texas A&M Engineering Experiment Station) Senior Faculty Fellow, Texas A&M University
2023	INFORMS Quality, Statistics and Reliability (QSR) Section 2023 Best Referred Paper Finalist, INFORMS
2022	Top Reviewer Award, International Conference on Artificial Intelligence and Statistics (AISTATS)
2021	College of Engineering Excellence Faculty Award, Texas A&M University
2021	Outstanding Reviewer Award, Neural Information Processing Systems (NeurIPS)
2020	Finalist of "Best Student Paper Awards" (6) , 45th International Conference on Acoustics, Speech, and Signal Processing (ICASSP)
2019	J. T. Oden Faculty Fellow, Oden Institute for Computational Engineering and Sciences, University of Texas, Austin
2018	TEES (Texas Engineering Experiment Station) Faculty Fellow, Texas A&M University
2017	Outstanding Professor Award, Department of Electrical & Computer Engineering, Texas A&M University
2016	NSF CAREER Award, National Science Foundation
2016	Montague-Center for Teaching Excellence Scholar, Texas A&M University
2016	TEES Young Faculty Fellow, Texas A&M University
2015	Best Paper Award, International Conference on Intelligent Biology and Medicine (ICIBM)
2013	Best Paper Award, 11th Asian Pacific Bioinformatics Conference (APBC)
2003	"Oak Ridge Lab Fellowship" for the "Medical Informatics Training Program", Lister Hill National Center, National Institutes of Health
2000	Yale Alumni Fellowship, Yale University
1999	Rockwell Scholarship, Shanghai Jiao-Tong University
1999	Excellent Master Thesis , Shanghai City

C. Contribution to Science

1. My main research focus is on systems analysis of biological networks by developing mathematical models and corresponding computational algorithms. Network-based diagnosis and intervention is one

of the ultimate objectives of studying systems biology. Degenerative diseases including cancer and diabetes are systems impairments due to the failure of normal cellular function. To develop accurate and reliable diagnostics and effective intervention therapeutics, it is important to study the complex molecular interactions at systems level. Engineering, especially system engineering and control theory, has had important successes to reliably predict and adaptively control large engineering or artificial systems' behavior even with only limited information. I have been developing stochastic dynamic models that underlie many systems engineering successes to design network diagnosis and intervention strategies for effective future genetic diagnostics and therapies of complex diseases including cancer and diabetes.

  a. Niyakan S, Sheng J, Cao Y, Zhang X, Xu Z, Wu L, Wong STC, Qian X. MUSTANG: Multi-sample spatial transcriptomics data analysis with cross-sample transcriptional similarity guidance. Patterns (N Y). 2024 May 10;5(5):100986. PubMed Central PMCID: PMC11117058.

  b. Wells KM, He K, Pandey A, Cabello A, Zhang D, Yang J, Gomez G, Liu Y, Chang H, Li X, Zhang H, Feng X, da Costa LF, Metz R, Johnson CD, Martin CL, Skrobarczyk J, Berghman LR, Patrick KL, Leibowitz J, Ficht A, Sze SH, Song J, Qian X, Qin QM, Ficht TA, de Figueiredo P. Brucella activates the host RIDD pathway to subvert BLOS1-directed immune defense. Elife. 2022 May 19;11 PubMed Central PMCID: PMC9119680.

  c. Hajiramezanali,Ehsan,, Hasanzadeh,Arman,, Duffield,Nick,, Narayanan,Krishna,R, Qian,Xiaoning,. BayReL: Bayesian Relational learning for multi-omics data integration. [Internet]. The 34th Conference on Neural Information Processing Systems (NeurIPS 2020); 2020 December.

  d. Li J, Bennett K, Stukalov A, Fang B, Zhang G, Yoshida T, Okamoto I, Kim JY, Song L, Bai Y, Qian X, Rawal B, Schell M, Grebien F, Winter G, Rix U, Eschrich S, Colinge J, Koomen J, Superti-Furga G, Haura EB. Perturbation of the mutated EGFR interactome identifies vulnerabilities and resistance mechanisms. Mol Syst Biol. 2013 Nov 5;9:705. PubMed Central PMCID: PMC4039310.

2. Comparative network analysis provides an integrative framework to study multiple data sources for a better understanding of underlying cellular mechanisms of biological functions, which helps us further develop methods to identify conserved pathways for evolution study; identify robust disease biomarkers for complex disease diagnosis/prognosis; and reconstruct regulatory networks to study their long-term dynamical behavior. My students and I have derived several efficient algorithms, based on systematic dynamic models, to solve these challenging problems.

  a. Niu P, Soto MJ, Huang S, Yoon BJ, Dougherty ER, Alexander FJ, Blaby I, Qian X. Sensitivity Analysis of Genome-Scale Metabolic Flux Prediction. J Comput Biol. 2023 Jul;30(7):751-765. PubMed PMID: 36961389.

  b. Maddouri O, Qian X, Yoon BJ. Deep graph representations embed network information for robust disease marker identification. Bioinformatics. 2022 Jan 27;38(4):1075-1086. PubMed PMID: 34788368.

  c. Boluki S, Qian X, Dougherty ER. Optimal Bayesian supervised domain adaptation for RNA sequencing data. Bioinformatics. 2021 Oct 11;37(19):3212-3219. PubMed PMID: 33822889.

  d. Choobdar S, Ahsen ME, Crawford J, Tomasoni M, Fang T, Lamparter D, Lin J, Hescott B, Hu X, Mercer J, Natoli T, Narayan R, Subramanian A, Zhang JD, Stolovitzky G, Kutalik Z, Lage K, Slonim DK, Saez-Rodriguez J, Cowen LJ, Bergmann S, Marbach D. Assessment of network module identification across complex diseases. Nat Methods. 2019 Sep;16(9):843-852. PubMed Central PMCID: PMC6719725.

3. My PhD research has studied mathematical models and optimization algorithms for biomedical image analysis. Especially, we have developed image segmentation, shape analysis and indexing using geometric and stochastic tools to aid visualization and diagnosis of cardiac, vascular, neurodegenerative, and spine diseases. My students and I are continuously working along this direction, especially, trying to develop practical tools in Minimal Invasive Surgeries (MIS) to integrate pre-operative and intra-operative images to improve situational awareness of surgeons for safer and more accurate surgeries.

a. Tsai CC, Li W, Hsu KJ, Qian X, Lin YY. Image Co-Saliency Detection and Co-Segmentation via Progressive Joint Optimization. IEEE Trans Image Process. 2019 Jan;28(1):56-71. PubMed PMID: 30059305.

b. Lin B, Sun Y, Qian X, Goldgof D, Gitlin R, You Y. Video-based 3D reconstruction, laparoscope localization and deformation recovery for abdominal minimally invasive surgery: a survey. Int J Med Robot. 2016 Jun;12(2):158-78. PubMed PMID: 25931190.

c. Qian X, Tagare HD, Fulbright RK, Long R, Antani S. Optimal embedding for shape indexing in medical image databases. Med Image Anal. 2010 Jun;14(3):243-54. PubMed Central PMCID: PMC2854880.

d. Qian X, Brennan MP, Dione DP, Dobrucki WL, Jackowski MP, Breuer CK, Sinusas AJ, Papademetris X. A non-parametric vessel detection method for complex vascular structures. Med Image Anal. 2009 Feb;13(1):49-61. PubMed Central PMCID: PMC2614119.