Lingyu **Li**

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ⓘ 1 June 1992, Dong'e, Shandong, China

CV of Miss Lingyu Li

Bio.   Postdoctoral Fellow with wide-ranging expertise in **bioinformatics and machine learning research** and extensive experiences in **biomedical data analysis and statistical evaluation**, able to work independently and as a collaborative team member.

Research interests.   Bioinformatics, Biomarker discovery, Sparse statistical learning, Data mining, Feature selection.

🎓 Educations

Aug 2023–Aug 2025 (Expected)	**Postdoctoral Fellow in Bioinformatics**, *The University of Hong Kong* (HKU), Pokfulam, Hong Kong SAR **Project** : Cell-cell communication patterns detection based on spatial transcriptomics data *Advisor : Dr. Yuanhua Huang*
Sep 2019–Jun 2023	**PhD in Biomedical Engineering**, *Shandong University* (SDU), Jinan **PhD thesis** : Biomarker discovery methods based on connected network regularized feature selection *Advisor : Prof. Zhi-Ping Liu*, **GPA** : 94.80/100 | **Rank** : 1/44
Dec 2021–Mar 2023	**Joint training PhD**, *The University of Hong Kong* (HKU), Pokfulam, Hong Kong SAR **Collaborations** : Application of Boolean networks and optimization algorithms in bioinformatics *Advisor : Prof. Wai-Ki Ching*, **Topics** : Mathematical Programming and Optimization
Sep 2016–Jun 2019	**Master of Computational Mathematics**, *Shandong Normal University* (SDNU), Jinan **Master thesis** : Numerical methods and theoretical analysis of a class of groundwater pollution problems *Advisor : Prof. Ziwen Jiang*, **GPA** : 3.98/5.0 | **Rank** : 1/8
Sep 2012–Jun 2016	**Bachelor of Mathematics and Applied Mathematics**, *Shandong Normal University* (SDNU), Jinan **Bachelor thesis** : Uniform convergence of function term series and its application *Advisor : Prof. Jinjun Fan*, **GPA** : 3.51/5.0 | **Rank** : 26/204

≡ Researches

Bioinformatics :	Biomarker discovery, Machine learning, Feature selection, Gene expression data, Boolean network
Mathematics :	Sparse statistical learning, Network-constrained regularization, Inverse problem, Numerical solution of PDEs
Main Courses :	Data Mining, Biomedical Big Data, Applied Statistical Analysis, Differential Method, Functional Analysis, Finite Element Method, Modern Partial Differential Equation Theory, Application Software and Programming

📖 Publications

– Yaohua Chang, **Lingyu Li**, Zhi-Ping Liu*. "GO4Cancer : Revealing function changes from rewiring regulations by network ontology analysis", Completed.(**The second author, 2/3**)

Gene ontology (GO)   Function enrichment analysis   Endometrial cancer   Difference molecular networks   Precision medicine

– Fatemeh Keikha, **Lingyu Li**, Wai-Ki Ching, Zhi-Ping Liu*. "NetWalkRank : Cancer driver gene prioritization in multiplex gene regulatory networks by a random walk approach". *Chemometrics and Intelligent Laboratory Systems* (**SCI, JCR : Q1, IF : 3.9**), Submitted. (**The second author, 2/4**)

Cancer driver gene prioritization   Gene regulatory networks   Multiplex networks   Differential mutual information   Random walk model

– Chengfa Sun, Changchun Liu*, Huiwen Dong, **Lingyu Li**, Yu Jiao, Xinpei Wang, Yuanyuan Liu. "CAD Stenosis Severity Identification based on an Optimal Hybrid Feature Extractor using Multi-modal Signals". *Biomedical Signal Processing and Control* (**SCI, JCR : Q1, IF : 5.1**), Submitted. (**The forth author, 4/7**)

CAD detection   Multi-channel jointed features   Multiple domains   Synchronous signals

– **Lingyu Li**, Zhi-Ping Liu*, "*Biomarker discovery from gene expression data by connected network-constrained support vector machine*", *Expert Systems with Applications* (**SCI, JCR : Q1, IF : 8.665**), vol.226, 120179, Apr 2023. (**Independent first author, 1/2**)

Network-constrained support vector machine   Biomarker discovery   Connectivity   Feature selection   High-throughput data   Breast cancer

– **Lingyu Li**, Liangjie Sun, Guangyi Chen, Chi-Wing Wong, Wai-Ki Ching*, Zhi-Ping Liu*. "*LogBTF : Gene regulatory network inference using Boolean threshold network model from single-cell gene expression data*", *Bioinformatics* (**SCI, JCR : Q1, IF : 6.931**), vol.39, no.5, btad256, Apr 2023. (**Independent first author, 1/6**)

Gene regulatory network inference   Boolean threshold network model   Logistic regression   Regularization   scRNA-seq data

– **Lingyu Li**, Yousif A. Algabri, Zhi-Ping Liu*. "*Identifying diagnostic biomarkers of breast cancer based on gene expression data and ensemble feature selection*", *Current Bioinformatics* (**SCI, JCR : Q1, IF : 4.850**), vol.18, no.3, pp.232-246, Mar 2023. (**Independent**

first author, 1/3)

`Biomarker` `machine learning` `Ensemble feature selection` `Gene expression data` `Breast cancer`

– **Lingyu Li**, Wai-Ki Ching, Zhi-Ping Liu*, "*Robust biomarker screening from gene expression data by stable machine learning-recursive feature elimination methods*", *Computational Biology and Chemistry* (**SCI, JCR : Q2, IF : 3.737**), vol.100, 107747, Jul 2022. (**Independent first author, 1/3**)

`Robust biomarker discovery` `Machine learning` `Recursive feature elimination` `Stable feature selection` `High-grade serous ovarian cancer`

– Yousif A. Algabri, **Lingyu Li**, Zhi-Ping Liu*, "*scGENA : A single-cell gene co-expression network analysis framework for clustering cell types and revealing biological mechanisms*", *Bioengineering* (**SCI, JCR : Q2, IF : 5.046**), vol.9, Jun 2022. (**The second author, 2/3**)

`scRNA-seq` `Cell heterogeneity ; Gene co-expression network analysis` `Gene modules` `Biological mechanisms` `Human diabetic pancreas`

– **Lingyu Li**, Zhi-Ping Liu*, "*A connected network-regularized logistic regression model for feature selection*", *Applied Intelligence* (**SCI, JCR : Q2, IF : 5.086**), vol.52, no.10, pp.11672-11702, Jan 2022. (**Independent first author, 1/2**)

`Regularized logistic regression` `Feature selection` `Network-based sparse penalty` `Network connectivity` `Biomarker discovery`

– **Lingyu Li**, Zhi-Ping Liu*, "*Detecting prognostic biomarkers of breast cancer by regularized Cox proportional hazards models*", *Journal of Translational Medicine* (**SCI, JCR : Q1, IF : 8.459**), vol.19, pp.1-20, Dec 2021. (**Independent first author, 1/2**)

`Breast cancer` `Regularized Cox proportional hazards model` `Feature selection` `Biomarker` `Prognostic risk score`

– **Lingyu Li**, Zhi-Ping Liu*, "Discovery of spontaneous preterm birth biomarkers based on machine learning", *Journal of Nanjing University(Natural Sciences)* (**In Chinese**), vol.57, no.5, pp.767-774, Sep 2021. (**Independent first author, 1/2**)

`Biomarkers` `Spontaneous preterm birth` `Machine learning` `Feature selection` `Bioinformatics`

– **Lingyu Li**, Zhi-Ping Liu*, "*Biomarker discovery for predicting spontaneous preterm birth from gene expression data by regularized logistic regression*", *Computational and Structural Biotechnology Journal* (**SCI, JCR : Q1, IF : 7.271**), vol.18, pp.3434-3446, Nov 2020. (**Independent first author, 1/2**)

`Biomarker discovery` `Spontaneous preterm birth` `Gene expression data` `Regularized logistic regression` `Feature selection` `Preterm risk score`

– **Lingyu Li**, Ziwen Jiang*, Zhe Yin*, "*Compact finite-difference method for 2D time-fractional convection–diffusion equation of groundwater pollution problems*", *Computational and Applied Mathematics* (**SCI, JCR : Q2, IF : 2.239**),vol.39, no.3, 142, May 2020. (**Independent first author, 1/3**)

`Compact finite-difference method` `Time-fractional convection–diffusion equation` `Stability and convergence` `Numerical examples`

– **Lingyu Li**, Ziwen Jiang*, Zhe Yin, "*Fourth-order compact finite difference method for solving two-dimensional convection–diffusion equation*", *Advances in Difference Equations* (**SCI, JCR : Q1, IF : 2.803**), vol.2018, no.1, pp.1-24, Jul 2018. (**Independent first author, 1/3**)

`Convection–diffusion equation` `Compact finite difference method` `Fourth-order accuracy` `Numerical experiments`

– **Lingyu Li**, Zhe Yin*, "*Numerical simulation of groundwater pollution problems based on convection diffusion equation*", *American Journal of Computational Mathematics* (**In English**), vol.7, no.3, pp.350–370, Sep 2017. (**Independent first author, 1/2**)

`Groundwater pollution` `Two-dimensional convection diffusion equation` `Finite difference method` `Visualization` `Numerical simulation`

👥 Projects

Nov 2020	Research on Mathematical Models and Algorithms in Breast Cancer Precision Medicine, National Key R&D Program, Participant – Combine Multi-omics data to develop optimization models and corresponding algorithms. `Multi-omics data` `Regulatory network` `Mathematical model` `Precision medicine`
Jan 2020	Research on Bioinformatics Methods for Integrating Multi-level Omics Data to Discover Complex Disease Biomarkers, National Natural Science Foundation of China (NSFC), Participant – Apply regularized regression models to select potential disease biomarkers. `Complex disease` `Regularization` `Feature selection` `External verification` `R`
Jul 2019	Generalized Fractional Equation of Surface Growth : Modeling, Calculation, Analysis and Application, Shandong Provincial Natural Science Foundation of China, Participant – Use numerical methods to solve fractional equations and perform numerical experiments. `Numerical methods` `Theoretical analysis` `Numerical examples` `MATLAB`
Dec 2016	Numerical Simulation Methods of Water Pollution Problem Based on Darcy-Stokes Coupling Model, National Natural Science Foundation of China Youth Project, Participant – Numerically solve convection-diffusion equations to simulate groundwater pollutants transport. `Groundwater pollution problem` `Compact difference method` `Numerical simulation` `MATLAB`

♡ Honors & Awards

Mar 2023	SDU 2023 outstanding graduates
Oct 2022	SDU 2022 *Ji Defa* Postgraduate Scholarship for PhD (**Higher** than first-class academic scholarship)
Aug 2022	HUST summer school on "Clinical Application of Epidemiology" and "Genetic and Molecular Epidemiology"
Jun 2022	HEU summer school on "Data and modeling in Biomathematics", Obtained the achievement award
Sep 2021	The Scholarship under Shandong University's Exchange Program (with **HKU**)
2021 & 2022	SDU 2021 & 2022 Outstanding Postgraduate Cadre Award (**twice**)
Jul 2021	FDU summer school on "Application and Innovation of Data Science", Obtained the graduation certificate
2021 & 2022	SDU advanced individuals in innovation and entrepreneurship (**twice**)
2021	SDU outstanding communist youth league member
2020 & 2022	SDU first-class academic scholarship for PhD (**twice**) ; SDU outstanding graduate student (**three times**)
2020 & 2021	PKU 2nd & 3nd summer school on "Biostatistics", Completed the course and obtained the graduation certificate
Dec 2019	SDU graduate innovation competition award
Jan 2019	SDNU 2019 outstanding graduates
Oct 2017	Shandong province 2017 excellent bachelor degree thesis
Oct 2013	National Encouragement Scholarship

⚙ Skills

Programming Skills :	**R** (5-year), Python (4-year), Matlab (10-year), Linux (3-year), LaTeX (7-year), **C**, Spass
Computer Certificates :	Computer 2-level **C language**, Computer 3-level **Network technology**
Other Certificates :	Putonghua proficiency **second-level A**, Teacher qualification certificate **Mathematics**

🗚 Languages

English :

Reading	● ● ● ● ●	CET-4 : 514
Listening	● ● ● ● ○	CET-6 : 467
Speaking	● ● ● ○ ○	

(last update : 5 Sep. 2023)