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. Biomarker discovery, Sparse statistical learning, Feature selection, Single-cell data science, Deep learning.

Educations

Aug 2023–Aug 2025 (Expected)	**Postdoctoral Fellow in Bioinformatics**, *The University of Hong Kong* (HKU), Hong Kong SAR **Project** : Cell-cell communication patterns detection based on spatial transcriptomics data *Advisor : Dr. Yuanhua Huang*, the winner of the Outstanding Youth Science Fund Project (Hong Kong)
Sep 2019–Jun 2023	**Ph.D. in Biomedical Engineering**, *Shandong University* (SDU), Jinan **Dissertation** : 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 Ph.D. in Bioinformatics**, *The University of Hong Kong* (HKU), 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	**M.Sc. of Computational Mathematics**, *Shandong Normal University* (SDNU), Jinan **Dissertation** : 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	**B.Sc. of Mathematics and Applied Mathematics**, *Shandong Normal University* (SDNU), Jinan **Dissertation** : 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, Single-cell data science, 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

[1] denotes equal contribution, * denotes corresponding author.
First Author :

- Yaohua Chang[1], **Lingyu Li**[1], Zhi-Ping Liu*. Uncovering differential functions in cancer : A network ontology analysis of gene regulation rewiring, Completed.
  Gene ontology (GO) | Function enrichment analysis | Endometrial cancer | Difference molecular networks | Precision medicine
- **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, Sep 2023.
  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.
  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.
  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.
  Robust biomarker discovery | Machine learning | Recursive feature elimination | Stable feature selection | High-grade serous ovarian cancer

- **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.
  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.
  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.
  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.
  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.
  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.
  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*, vol.7, no.3, pp.350–370, Sep 2017.
  Groundwater pollution | Two-dimensional convection diffusion equation | Finite difference method | Visualization | Numerical simulation
- **Lingyu Li**, Jinjun Fan*, "Uniform convergence of function term series and its application", *Journal of Shandong Normal University (Natural Science Edition)* (**In Chinese**), vol.31, no.4, pp.12–19, Dec 2016.
  Function term series | Uniform convergence | Programming realization | Application | MATLAB

Contributing Author :

- 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. *IEEE/ACM Transactions on Computational Biology and Bioinformatics* (**SCI, JCR : Q1, IF : 4.500**), Submitted.
  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 : 5.100**), Submitted.
  CAD detection | Multi-channel jointed features | Multiple domains | Synchronous signals
- 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.
  scRNA-seq | Cell heterogeneity ; Gene co-expression network analysis | Gene modules | Biological mechanisms | Human diabetic pancreas
- El Bairi K, Haynes H R, Blackley E, et al., The tale of TILs in breast cancer : A report from the international immuno-oncology biomarker working group, *NPJ Breast Cancer* (**SCI, JCR : Q1, IF : 7.519**), vol.7, Jun 2021.
  Breast cancer | TILs | Biological understanding

Dissertation :

- **Lingyu Li**. Biomarker discovery methods based on connected network regularized feature selection, Shandong University.
- **Lingyu Li**. Numerical methods and theoretical analysis of a class of ground water pollution problems, Shandong Normal University.
- **Lingyu Li**. Uniform convergence of function term series and its application, Shandong Normal University.

Patents :

- Zhi-Ping Liu, **Lingyu Li**, Jiaxin Yang, Chuanyan Wu, Rui Gao. A prognostic biomarker identification system, Page bookmark : CN117352048A, Jan 2024.

Presentations

- **Lingyu Li**, Yuanhua Huang*, Fine ligand-receptor interaction discovery by fusing spatial transcriptomics and histology stains. in *The 1st HKU-CUHK Joint Postdoctoral Biomedical Sciences Symposium* (Oral Presentation), 2024.
- **Lingyu Li**, Zhi-Ping Liu*, Identifying diagnostic biomarkers of high-grade serous ovarian cancer based on geneexpression data and machine learning methods. in *The Sixth CCF Bioinformatics Conference* (Oral Presentation), 2021.
- **Lingyu Li**, Zhi-Ping Liu*, Discovery of spontaneous preterm birth biomarkers based on machine learning. in *CCF Conference on Artificial Intelligence* (Poster Presentatio), 2021.

Projects

Oct 2024	**Research on Mathematical Models and Algorithms in Breast Cancer Precision Medicine**
Nov 2020	– National Key R&D Program, NO. 61973190.
	– Participant.
Dec 2023	**Research on Bioinformatics Methods for Integrating Multi-level Omics Data to Discover Complex Disease Biomarkers**
Jan 2020	– National Natural Science Foundation of China (NSFC) General Projects, NO. 61973190.
	– Participant.
Jun 2021	**Generalized Fractional Equation of Surface Growth : Modeling, Calculation, Analysis and Application**
Jul 2019	– Natural Science Foundation of Shandong Provincial, NO. ZR2019BA026.
	– Participant.
Nov 2019	**Numerical Simulation Methods of Water Pollution Problem Based on Darcy-Stokes Coupling Model**
Dec 2016	– National Natural Science Foundation of China (NSFC) Youth Project, NO. 61501335.
	– Participant.

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

Professional service

2022–Present Peer Reviewer,
iScience, *Communications Biology*, *Briefings in Functional Genomics*,
BMC Medical Informatics and Decision Making, *Journal of Biomolecular Structure & Dynamics*, etc.

Teaching assistant

Sep 2019–Jan 2020	Teaching Assistant, Complex Functions and Laplace Transform, Automation, Shandong University.
Feb 2019–Jun 2019	Teaching Assistant, Probability Theory and Mathematical Statistics, Shandong Jiaotong University.
Feb 2018–Jan 2019	Teaching Assistant, Advanced Algebra I&II, Statistics 1801 and 1802, Shandong Normal University.
Sep 2018–Jan 2019	Teaching Assistant, Advanced Mathematics II, Economics 1701, Shandong Normal University.
Feb 2017–Jan 2018	Teaching Assistant, Mathematical Analysis I&II, Mathematics 1703 and 1704, Shandong Normal University.

Skills

Programming Skills :	**R** (6-year), Python (5-year), Matlab (11-year), Linux (4-year), LaTeX(8-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 : 4 March 2024)