CURRICULUM VITAE OF **JUDICE L.Y. KOH** （辜丽蓉） Ph.D.

RESEARCH INTEREST AND PUBLICATIONS

Machine Learning, Artificial Intelligence, Computer Vision, Statistical Analysis, Drug discovery, Data Analytics, Cancer Research, Precision Oncology.

H-index: 25 (Google Scholar) and ~6k citations. 12 first-author peer-reviewed publications including *Cell (2015), PNAS, Nuclei acid Research*, and 40 co-author peer-reviewed publications including Science, Cancer Discovery, Nature Methods, and Nature Communications.

EDUCATION

2002-2007	Ph.D. in Computer Science National University of Singapore, School of Computing Supervisor: Prof. LEE Mong Li Thesis: *Correlation-based Methods for Data Cleaning, with Application to Biological Databases*
1998-2001	M.Tech in Software Engineering National University of Singapore, Institute of System Science
1993-1996	B.Sc in Computational Science with Chemistry National University of Singapore, Faculty of Science

PROFESSIONAL EXPERIENCE

Oct 2023 – current	Lecturer Department of Biomedical Informatics, Yong Loo Lin School of Medicine, National University of Singapore (NUS)
Oct 2022 – current	Scientific Advisor / Consultant Singapore Clinical Research Institute (SCRI) Co-Founder (Advisor) Dandelion Biosciences Pte Ltd (China)
Oct 2022 – Oct 2023	Associate Faculty Singapore Institute of Technology (SIT)
Nov 2019 – Jun 2022	Member (and EDDC representative member) AI^3, HTPO A*STAR
Sep 2019 – Jun 2022	Head, Computational Phenomics Group Experimental Drug Development Centre (EDDC), A*STAR Head, UCeP Platform / Project Dandelion (spin-off) Experimental Drug Development Centre (EDDC), A*STAR
Nov 2015 – Sep 2020	Platform Leader Computational Phenomics Platform Genome Institute of Singapore (GIS), A*STAR
Feb 2015 – Oct 2015	Staff Scientist Cancer Therapeutics and Stratified Oncology Genome Institute of Singapore, A*STAR
Aug 2009 –	Research Associate

Dec 2011	Banting and Best Department, Terrence Donnelly Centre for Cellular and Bio-molecular Research (CCBR), University of Toronto, Canada Supervisor: Prof. Jason MOFFAT
May 2007 – Jul 2009	Postdoctoral Fellow Banting and Best Department, Terrence Donnelly Centre for Cellular and Bio-molecular Research (CCBR), University of Toronto, Canada Supervisor: Prof. Charles BOONE
2005-2007	Acting Lab Head (Management role) ImmunoInformatics Lab, Knowledge Discovery Department, Institute for Infocomm Research (I^2R), Agency for Science, Technology and Research (A*STAR), Singapore Department Head: Dr. NG See Kiong
1999-2007	Research Scientist/Research Associate/Senior Research Officer/Senior Research Engineer (Official designations) ImmunoInformatics Lab, Knowledge Discovery Department, Institute for Infocomm Research (I^2R), Agency for Science, Technology and Research (A*STAR), Singapore Lab Head: Dr. Vladimir BRUSIC Department Head: Prof. WONG Lim Soon

RECENT ORAL, POSTER PRESENTATIONS AND LECTURES

1. **Koh JLY** (Speaker) A*STAR AI and Analytics Talk Series. "AI applications in Drug Discovery". 17th Sep 2021.

2. **Koh JLY** (Lead Lecturer) "AI + Drug Discovery and Protein Interactions". NTU online course, Apr – May 2021**.**

3. **Koh JLY** (Invited Speaker) **"**Seeing is Believing: Deep Content Screening for Drug Discovery". *AI Powering Pharma Innovation (Symposium)*, Singapore, A*STAR Drug Development week, 25 June 2019.

4. **Koh JLY** (Invited Speaker) **"**AI Drug Discovery". *2nd Annual Digital Pharmacon Asia, Singapore*, 25 Sep 2019.

5. **Koh JLY** (Speaker) "Introduction to Computational Phenomics". *NUS Pharmacology department (organised by RSC),* 16 Sep 2019

6. **Koh JLY** (Invited Speaker) **"**AI Drug Discovery". *Opening ceremony of LumiSTAR Biotech, Taipei, Taiwan,* 16 July 2019.

7. **Koh JLY** (Invited Speaker) **"**Comprehensive Profiling of drug response in Patient-derived Tumor Spheroids". *8th Regional Conference on Molecular Medicine (RCMM) and 4th National Conference for Cancer Research (NCCR)*, UKM Medical Biology Institute, Kuala Lumpur, Malaysia, 19-20 Sep 2018.

8. Thangavelu M, Chan JV, Zhang XQ, Chia SM, Gopalakrishna Iyer N, Dasgupta R, Periysamy G, **Koh JLY** (Poster Presentation) "Predictive Modeling of Drug Response Kinetics in Patient-Derived Micro-Tumors using 4D High Content Screening". *EMBL Symposium: Seeing is Believing - Imaging the Processes of Life*, EMBL Heidelberg, Germany, 4-7 Oct 2017.

9. Hong BR, Singh M, Chan JV, Thangavelu M, Periysamy G, Lee HK, **Koh JLY** (Poster Presentation) "Predicting Drug Response in 3D Tumor Spheroids using Convolutional Neural Networks". *EMBL Symposium: Seeing is Believing - Imaging the Processes of Life*, EMBL Heidelberg, Germany, 4-7 Oct 2017.

PATENTS

- **Koh JLY**, Periyasamy G, Dasgupta R 2017. "A Label-Free Method And System For Measuring Drug Response Kinetics Of Three-dimensional Cellular Structures" (SG Provisional Application No. 10201706639T, published 2020 US patent: 16638551)
- **Koh JLY** et al. 2003. A System, Method and Interface for Building Biological Databases using Templates" (UK patent: 0306836.8 and Singapore patent: 200301601-0)

GRANT AWARDS

- Lead PI for A*STAR GAP proposal. "Cellular Protein-Chemical Interaction profiling platform for Drug Discovery and Drug Target Analysis". Requested amount SGD499k for 2 years. Status: Novel platform established. Completed in Mar 2022. Platform spin-off as a biotech startup.
- Co-founded Biotech startup (Dandelion Biosciences Pte Ltd) in Jan 2022.

COLLABORATIONS

- PI in collaboration with Rhea Pharmaceuticals to deconvolute their lead anti-fungal compound. Delivered in Feb 2021.

- Co-PI of Genome Institute of Singapore (GIS), A*STAR with PerkinElmer Inc. "Develop computational analysis system and methods to enable 3D High Content Screening (HCS) of microtumors/spheroids for Precision Oncology". 2018-2021

- Co-PI of Genome Institute of Singapore (GIS), A*STAR with LumiSTAR, Taiwan. "Develop experimental and computational Ca2+ imaging platform for high throughput phenotypic profiling in neurodegenerative diseases, diabetes and cancer". 2018-2021

- Co-PI of Institute for Infocomm Research, Singapore with University of Queensland, Australia to develop an integrative plant genomic database, 2005-2006

- Co-PI of Institute for Infocomm Research, Singapore with Department of Biochemistry, National University of Singapore to develop a data warehouse for study of Lipidomics (Co-PI: Dr. Markus R. Wenk), 2006-2007.

SELECTED PUBLICATIONS

Precision Oncology

1. Low JL, Lau DP, Zhang X, Kwang XL, Rohatgi N, Chan JV, Chong FT, Wong SQR, Leong HS, Thangavelu MT, Rikka S, Skanderup AMJ, Tan DSW, Periyasamy G, **Koh JLY**, Iyer NG, DasGupta R. (2021) "A chemical genetic screen identifies Aurora kinases as a therapeutic target in EGFR T790M negative, gefitinib-resistant head and neck squamous cell carcinoma (HNSCC)". *EBioMedicine.* 64:103220

2. Kong LR, Ong RWJ, Tan TZ, Thangavelu M, Chan JV, **Koh JLY**, Periyasamy G, Lee M, LIM CM, Chng WJ, Lane D, Venkitaraman A, Hung H, Cheok CF, and Goh BC (2021) "Targeting codon 158 p53-mutant cancers via the induction of p53 acetylation". *Nat Commun.* 11, 2086.

3. Gopinath S, Yim D, Lakshmanan V, Tirumalai V, **Koh JLY**, Park JE, Cheong J, Low JL, Lim M, Gulyani A, Padubidri S, Sze K, Raghavan S, Palakodeti D, and DasGupta R (2019) "Dynamic expression of tRNA-derived small RNAs define cellular states". *EMBO Reports.* 20(7):e47789.

4. Chia S, Low JL, Zhang X, Kwang XL, Chong FT, Sharma A, Bertrand D, Toh SY, Leong HS, Thangavelu MT, Hwang JSG, Lim KH, Skanthakumar T, Tan HK, Su Y, Hui Choo S, Hentze H, Tan IBH, Lezhava A, Tan P, Tan DSW, Periyasamy G, **Koh JLY**, Gopalakrishna Iyer N, DasGupta R (2017) "Phenotype-driven precision oncology as a guide for clinical decisions one patient at a time". *Nat Commun.* 2017 Sep 5;8(1):435.

Cellular Imaging and Machine Learning

5. Ho BX, Kah JSP, Phua QH, Lew LC, Poh BM, Chen Y, Loh YH, An O, Yang HH, Seshachalam VP, **Koh JLY**, Ng SY, Soh BS (2021) "Generation of human chambered cardiac organoids from pluripotent stem cells for improved modelling of cardiovascular diseases". *Biorxiv preprint.* https://doi.org/10.1101/2021.05.21.445153.

6. *Chong YT, ***Koh JLY***, Friesen H, Duffy SK, Cox MC, Moses A, Moffat J, Boone C, and Andrews B (2015) "Yeast Proteome Dynamics from Single Cell Imaging and Automated Analysis." *Cell* 2015 June 4; 161(6), p1413–1424. *equal contribution*

7. *****Koh JLY**, *Chong YT, Moses A, Andrews B, Moffat J (2015) "CYCLoPs: A comprehensive database constructed from automated analysis of protein abundance and sub-cellular localization patterns in *Saccharomyces cerevisiae*.". *G3* 2015 Apr 15;5(6):1223-1232. *equal contribution*

8. Witkin KL, Chong Y, Shao S, Webster MT, Lahiri S, Walters AD, Lee B, **Koh JLY**, Prinz WA, Andrews BJ, Cohen-Fix O (20120 "The Budding Yeast Nuclear Envelope Adjacent to the Nucleolus Serves as a Membrane Sink during Mitotic Delay". *Current Biology*, 22, 12, 1128-1133.

RNAi screening of Cancer Genomes

9. **Koh JLY**, Brown KR, Sayad A, Kasimer D, Ketela T, Moffat J (2012) "COLT-Cancer: A database of essential genes in human cancer cells". *Nucleic Acids Research (NAR)*, 40, Database issue D957–D963.

10. Marcotte R, Brown KR, Suarez F, Sayad A, Karamboulas K, Krzyzanowski PM, Sircoulomb F, Medrano M, Fedyshyn Y, **Koh JLY**, van Dyk D, Fedyshyn B, Luhova M, Brito GC, Vizeacoumar FJ, Vizeacoumar FS, Datti A, Kasimer D, Buzina A, Mero P, Misquitta C, Normand J, Haider M, Ketela T, Wrana JL, Rottapel R, Neel BG, Moffat J (2012) "Essential gene profiles in breast, pancreatic, and ovarian cancer cells". *Cancer Discovery*, 2(2), pp172-89.

11. Ketela T, Heisler LE, Brown KR, Ammar R, Kasimer D, Surendra A, Ericson E, Blakely K, Karamboulas D, Smith AM, Durbic T, Arnoldo A, Cheung-Ong K, **Koh JLY**, Gopal S, Cowley GS, Yang X, Grenier JK, Giaever G, Root DE, Moffat J, Nislow C (2011) "A comprehensive platform for highly multiplexed mammalian functional genetic screens". *BMC Genomics.* 2011 May 6;12:213.

Large-scale Network Analysis of Genetic Interactions in Yeast

12. **Koh JLY**, Ding H, Costanzo M, Baryshnikova A, Toufighi K, Bader GD, and Boone C (2010) "DRYGIN: a database of quantitative genetic interaction networks in yeast". *Nucleic Acids Research (NAR)*, 38, Database issue D502-507.

13. *Dixon SJ, *Fedyshyn Y, *****Koh JLY**, Prasad TS, Chahwan C, Chua G, Toufighi K, Baryshnikova A, Hayles J, Hoe K, Kim D, Park H, Myers CL, Pandey A, Durocher D, Andrews BJ, and Boone C (2008) "Significant Conservation of Synthetic Lethal Genetic Interaction Networks between Distantly-Related Eukaryotes". *Proc. Natl. Acad. Sci. (PNAS)*, 105(43), pp16653-16658. *equal contribution*

14. Costanzo M, Baryshnikova A, Bellay J, Kim Y, Spear ED, Sevier CS, Ding H, **Koh JLY**, Toufighi K, Mostafavi S *et al.* (2010) "The Genetic Landscape of a Cell", *Science* 22, 327(5964) pp425-431.

15. Baryshnikova A, Costanzo M, Kim Y, Ding H, **Koh JLY**, Toufighi K, Youn JY, Ou J, San Luis BJ, Bandyopadhyay S, Hibbs M, Hess D, Gingras AC, Bader GD, Troyanskaya OG, Brown GW, Andrews B, Boone C, Myers CL. (2010) "Quantitative analysis of fitness and genetic interactions in yeast on a genome scale." *Nat Methods*, 7(12), 1017-1024*.*

Correlation-based Methods for Data Cleaning, with Application to Biological Databases

16. **Koh JLY**, Lee ML, Hsu W, and Ang WT (2008) "Correlation-based Attribute Outlier Detection in XML". *Proceedings of the 24th International Conference on Data Engineering (ICDE)*, pp1522-1524. [Leading database conference]

17. Lau QF, Hsu W, **Koh JLY**, and Lee ML (2008) "DeepDetect: An Extensible System for Detecting Attribute Outliers & Duplicates in XML". *Proceedings of the13th International Conference on Database Systems for Advanced Applications (DASFAA) Workshop on Data Quality in Collaborative Information Systems*. [Invited paper]

18. **Koh JLY**, Lee ML, Hsu W, and Lam KT (2007) "Correlation-based Detection of Attribute Outlier". *Proceedings of the12th International Conference on Database Systems for Advanced Applications (DASFAA)*: pp164-175.

19. KT Lam, **Koh JLY**, Veeravalli B, and Brusic V (2006) "Incremental Maintenance of Biological Databases Using Association Rule Mining". *Lecture Notes in Bioinformatics (LNBI)* 4147: pp140-150.

20. **Koh JLY**, Lee ML, and Brusic V (2005) "A Classification of Biological Data Artifacts". *Proceedings of the International Conference on Database Theory (ICDT) Workshop on Database Issues in Biological Database (DBiBD)*: pp53-57.

21. **Koh JLY**, Lee ML, Khan AM, Tan PTJ, and Brusic V (2004) "Duplicate Detection in Biological Data using Association Rule Mining". *Proceedings of ECML/PKDD Workshop on Data Mining and Text Mining for Bioinformatics*: pp31-37.

Biological Data Warehousing System

22. **Koh JLY** and Brusic V (2005) "Bioinformatic Database Warehousing". *Bioinformatics Technologies*, Chen YPP ed., Springer, Chapter 3: pp45-62.

23. Brusic V and **Koh JLY** (2004) "Genetic Databases". *Mammalian Genomics*, Ruvinsky A and Marshall Graves JA ed., CABI Publishing, Wallingford, Chapter 16: pp411-427.

24. **Koh JLY**, Krishnan SPT, Seah SH, Tan PTJ, Khan AM, Lee ML, and Brusic V (2004) "BioWare: A Framework for Bioinformatics Data Retrieval, Annotation, and Publishing". *Proceedings of the ACM SIGIR Workshop on Search and Discovery in Bioinformatics (SIGIRBIO)*, Sheffield, UK,

25. **Koh JLY**, and Brusic V (2004) "Warehousing of Biological Data". *Proceedings of the PRICAI Workshop on Knowledge Discovery in BioMedicine 2004 (KDbM-04)*, Auckland, New Zealand, Aug 2004: pp101-108.

ImmunoInformatics and VenomInformatics

26. Zhang ZH, **Koh JLY**, Zhang GL, Choo KH, Tammi KT, and Tong JC (2007) "AllerTool: a Web Server for Predicting Allergenicity and Allergic Cross-reactivity in Proteins". *Bioinformatics* 23(4): pp504-506.

27. Zhang ZH, Tan CC, **Koh JLY**, Falus A, and Brusic V (2006) "ALLERDB Database and Integrated Bioinformatic Tools for Assessment of Allergenicity and Allergic Cross-reactivity". *Cellular Immunology* 244(2): pp90-96.

28. Tongchusak S, Chaiyaroj SC, Veeramani A, **Koh JLY**, and Brusic V (2005) "CandiVF – Candida Albicans Virulence Factor Database". *International Journal of Peptide Research and Therapeutics*, 11(4): pp 271-277.

29. Schönbach C, **Koh JLY**, Flower DR, and Brusic V (2004) "An update on Functional Molecular Immunology Database FIMM". *Applied Bioinformatics*, 4(1): pp25-31.

30. Brahmachary M, Krishnan SP, **Koh JLY**, Khan AM, Seah SH, Tan TW, Brusic V, Bajic VB (2004) "ANTIMIC: a database of antimicrobial sequences". *Nucleic Acids Research*, 32(1): pp586-589.

31. Tan PTJ, Srinivasan KN, Seah SH, **Koh JLY**, Tan TW, Ranganathan S, and Brusic V (2004) "Accurate Prediction of Scorpion Toxin Functional Properties from Primary Sequence". *Journal of Molecular Graphics and Modeling*, 24: pp17-24.

32. Siew JP, Khan AM, Tan PT, **Koh JLY**, Seah SH, Koo CY, Chai SC, Armugam A, Brusic V, and Jeyaseelan K (2004) "Systematic Analysis of Snake Neurotoxins Functional Classification using a Data Warehousing Approach". *Bioinformatics*, 20(18): pp3466-3480.

33. Schönbach C, **Koh JLY**, Sheng X, Wong L, and Brusic V (2000) "FIMM, a Database of Functional Molecular Immunology". *Nucleic Acids Research*, 28(1): pp222-224.

34. Yu K, Petrovsky N, Schönbach C, **Koh JLY**, and Brusic V (2002) "Methods for Prediction of Peptide Binding to MHC Molecules: A Comparative Study". *Molecular Medicine*, 8: pp137-148.

Extraction of Protein-Protein Interactions from Free Text using Natural Language Processing (NLP) or Text-mining methods

35. Hosaka J, **Koh JLY**, Konagaya A (2003) "Effect of Utilizing Terminology on Extraction of Protein-Protein Interaction Information from Biomedical Literature". Proceeding of *10th Conference of the European Chapter of the Association for Computational Linguistics Conference (EACL)*, Apr 2003, Budapest, Hungary, pp107-110.

36. Hosaka J, **Koh JLY**, Konagaya A (2003) "Information Extraction from Biomedical Literature: On the Terminology Lexicon Use". Proceedings of *8th Annual Meeting of the Japanese Association for Natural Language Processing (NLP)*, Mar 2003, Yokohama, Japan.

Others

37. *Ho CH, *Magtanong L, *Barker SL, Gresham D, Nishimura S, Natarajan P, **Koh JLY**, Porter J, Gray CA, Andersen RJ, Giaever G, Nislow C, Andrews B, Botstein D, Graham TR, Yoshida M, Boone C (2009) "Molecular Barcoded Yeast ORF Library: Application to Mode-of-Action Analysis of Bioactive Compounds". *Nature Biotechnology*, 27(4): pp369-377

38. Lenffer J, Lai P, El ejaber W, Khan AM, **Koh JLY**, Tan PT, Seah SH, and Brusic V (2004) "CysView: Protein Classification Based on Cysteine Pairing Patterns". *Nucleic Acids Research (NAR)*, 32, W350-355.

39. Bajic VB, Seah SH, Chong A, Krishnan SP, Koh JL, Brusic V (2003) "Computer model for recognition of functional transcription start sites in RNA polymerase II promoters of vertebrates". *J Mol Graph Model*, 21(5): pp323-332.

40. Bajic VB, Seah SH, Chong A, Zhang G, **Koh JL**, Brusic V (2002) "Dragon Promoter Finder: recognition of vertebrate RNA polymerase II promoters", *Bioinformatics*, 18(1): pp198-199.