KHANH N. DINH

Associate Research Scientist
Irving Institute for Cancer Dynamics and Department of Statistics
Columbia University

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Professional experience

2023-Current	Irving Institute for Cancer Dynamics, Columbia University, New York, NY
	Associate Research Scientist
2019-2023	Irving Institute for Cancer Dynamics, Columbia University, New York, NY
	Postdoctoral Research Scientist
	Supervisor: Simon Tavaré, Ph.D.
2018-2019	Rice University, Houston, TX
	Postdoctoral Research Associate
	Supervisor: Marek Kimmel, Ph.D.

Education

2013-2018	Ph.D. in Mathematics, University of Alabama
	Advisor: Roger Sidje, Ph.D.
	Dissertation topic: Inexact methods for the Chemical Master Equation with constant or time-varying propensities, and application to parameter inference
2009-2013	B.A. in Mathematics, University of Sciences, Ho Chi Minh city, Vietnam
	Major: Analysis

Awards

2021	Emerging leader in computational oncology
	Memorial Sloan Kettering Cancer Center
2018	Outstanding research award
	Department of Mathematics, University of Alabama
2015-2018	Ainsworth scholarship in Applied Mathematics
	Department of Mathematics, University of Alabama
2014-2018	University of Alabama travel fund
2017	Travel fund

BIOMATH conference, Kruger, South Africa

2012 Bachelor Degree with Outstanding Rank, top 3 of the Honors class

Preprints

1. **Dinh KN**, Xiang Z, Liu Z, Tavaré S. *Approximate Bayesian Computation sequential Monte Carlo via random forests*. arXiv. 2024. doi: 10.48550/arXiv.2406.15865.

2. McPherson AW, Vazquez-Garcia I, Myers MA, Zatzman M, Al-Rawi DH, Weiner AC, Freeman SS, Mohibullah N, Satas G, Williams MJ, Ceglia N, Zhang A, Li J, Lim JLP, Wu M, Choi S, Havasov E, Grewal D, Shi H, Kim M, Schwarz R, Kaufmann T, **Dinh KN**, Uhlitz F, Tran J, Wu Y, Patel R, Ramakrishnan S, Kim D, Clarke J, Green H, Ali E, DiBona M, Varice N, Kundra R, Broach V, Gardner GJ, Roche KL, Sonoda Y, Zivanovic O, Kim SH, Grisham RN, Liu YL, Viale A, Rusk N, Lakhman Y, Ellenson LH, Tavaré S, Aparicio S, Chi DS, Aghajanian C, Abu-Rustum NR, Friedman CF, Zamarin D, Weigelt B, Bakhoum SF, Shah SP. *Ongoing genome doubling promotes evolvability and immune dysregulation in ovarian cancer*. bioRxiv. 2024. doi: 10.1101/2024.07.11.602772.

3. Czerniak B, Lee S, Jung SY, Kus P, Bondaruk J, Lee J, Jaksik R, Putluri N, **Dinh KN**, Cogdell D, Chen H, Wang Y, Chen J, Nevai N, Dinney C, Mendelsohn C, McConkey D, Behringer R, Guo C, Wei P, Kimmel M. *Inferring bladder cancer evolution from mucosal field effects by whole-organ spatial mutational, proteomic, and metabolomic mapping*. Research Square. 2024. doi: 10.21203/rs.3.rs-3994376/v1.

Publications

4. **Dinh KN**, Vázquez-García I, Chan A, Malhotra R, Weiner A, McPherson AW, Tavaré S. *CINner: modeling and simulation of chromosomal instability in cancer at single-cell resolution*. PLOS Computational Biology. 2025;21(4):e1012902. doi: 10.1371/journal.pcbi.1012902.

5. Xiang Z, Liu Z, **Dinh KN**. *Inference of chromosome selection parameters and missegregation rate in cancer from DNA-sequencing data*. Scientific Reports. 2024;14(17699). doi: 10.1038/s41598-024-67842-9.

6. Jaksik R, Szumała K, **Dinh KN**, Śmieja J. *Multiomics-based feature extraction and selection for the prediction of lung cancer survival*. International Journal of Molecular Sciences. 2024;25(7):3661. doi: 10.3390/ijms25073661.

7. **Dinh KN**, Kurpas MK, Kimmel M. *Comparison of Tug-of-War models assuming Moran versus Branching Process population dynamics*. eLife. 2024. doi: 10.7554/eLife.94597.1.

8. Bondaruk J, Jaksik R, Wang Z, Cogdell D, Lee S, Chen Y, **Dinh KN**, Majewski T, Zhang L, Cao S, Tian F, Yao H, Kuś P, Chen H, Weinstein J, Navai N, Dinney C, Gao J, Theodorescu D, Logothetis C, Guo C, Wang W, McConkey D, Wei P, Kimmel M, Czerniak B. *The origin of bladder cancer from mucosal field effects*. iScience. 2022;25(7):104551. doi: 10.1016/j.isci.2022.104551.

9. **Dinh KN**, Jaksik R, Kimmel M, Lambert A, Tavaré S. *Statistical inference for the evolutionary history of cancer genomes*. Statistical Science. 2020;35(1). doi: 10.1214/19-sts7561.

10. **Dinh KN**, Corey SJ, Kimmel M. *Application of the Moran model in estimating selection coefficient of mutated CSF3R clones in the evolution of severe congenital neutropenia to Myeloid Neoplasia*. Frontiers in Physiology. 2020;11:806. doi: 10.3389/fphys.2020.00806.

11. **Dinh KN**, Jaksik R, Corey SJ, Kimmel M. *Predicting time to relapse in Acute Myeloid Leukemia through stochastic modeling of Minimal Residual Disease based on clonality data*. Computational and Systems Oncology. 2021;1(3). doi: 10.1002/cso2.1026.

12. **Dinh KN**, Sidje RB. *A comparison of the Magnus expansion and other solvers for the Chemical Master Equation with variable rates*. Recent Advances in Mathematical and Statistical Methods: IV AMMCS International Conference, Waterloo, Canada, 2018 (pp. 261-270). Springer International Publishing.

13. **Dinh KN**, Sidje RB. *An adaptive Magnus expansion method for solving the Chemical Master Equation with time-dependent propensities*. Journal of Coupled Systems and Multiscale Dynamics. 2017;5(2):119-31. doi: 10.1166/jcsmd.2017.1124.

14. **Dinh KN**, Sidje RB. *An application of the Krylov-FSP-SSA method to parameter fitting with maximum likelihood*. Physical Biology. 2017;14(6):065001. doi: 10.1088/1478-3975/aa868a.

15. **Dinh KN**, Sidje RB. *Analysis of inexact Krylov subspace methods for approximating the matrix exponential*. Mathematics and Computers in Simulation. 2017;138:1-13. doi: 10.1016/j.matcom.2017.01.002.

16. **Dinh KN**, Sidje RB. *Understanding the Finite State Projection and related methods for solving the Chemical Master Equation*. Physical Biology. 2016;13(3). doi: 10.1088/1478-3975/13/3/035003.

Mentoring

2025-current	**Sara El Baghdadi**	MA, École Polytechnique
2025-current	**Ethan Cohen**	MA, École Polytechnique
2025-current	**Shuxin Tang**	MA, Department of Statistics, Columbia University
2025-current	**Yanjie Chen**	MA, Department of Statistics, Columbia University
2025-current	**Zihan Zhang**	MA, Department of Statistics, Columbia University
2025-current	**Tianshuai Gao**	MA, Department of Statistics, Columbia University
2025-current	**Zhuoxuan Li**	MA, Department of Statistics, Columbia University
2025-current	**Keito Taketomi**	MA, Department of Statistics, Columbia University
2023-2025	**Andrew Chan**	BS, Case Western Reserve University
2024	**Yining Ma**	MA, Department of Statistics, Columbia University
2024	**Xuanwen Guo**	MA, Department of Statistics, Columbia University
2024	**Junze Huang**	MA, Department of Statistics, Columbia University
2024	**Boan Zhu**	MA, Department of Statistics, Columbia University

2024	**Ruilin Dai**	MA, Department of Statistics, Columbia University
2024	**Yichi Yang**	MA, Department of Statistics, Columbia University
2024	**Elliott Seo**	BS, Stony Brook University
2023	**Zijin Xiang**	MA, Department of Statistics, Columbia University
2023	**Zhihan Liu**	MA, Department of Statistics, Columbia University
2024	**Tess Breton**	MA, École Polytechnique
2024	**Madeleine Hueber**	MA, École Polytechnique
2024	**Ranjing Zhang**	MA, Department of Statistics, Columbia University
2024	**Wenhe Chen**	MA, Department of Statistics, Columbia University
2023	**Amanda Samuel**	MA, Department of Statistics, Columbia University
2023	**Jiapeng Li**	MA, Department of Statistics, Columbia University

Expertise

Computational oncology	Analysis of bulk and single-cell DNA-sequencing data
Mathematics	Numerical algorithms, Differential Equations, Real Analysis
Programming	HPC, R, Matlab, Fortran, C/C++

Services

Editorial board	Frontiers in Oncology; Frontiers in Genetics
Funding reviewer	French National Research Agency (ANR) AAPG, 2023
Manuscript reviewer	npj Precision Oncology; Scientific Reports;
	Applied Mathematics and Computation; Stochastic Models;
	Frontiers in Ecology and Evolution; Frontiers in Genetics;
	Frontiers in Oncology; Bulletin of Mathematical Biology

Conference presentations

American Mathematical Society (AMS) Fall Central Sectional Meeting, San Antonio, TX, 2024

25th International Symposium on mathematical programming, Montréal, Canada, 2024

IICD Intensive Workshop: Methods in single-cell data integration and optimal transport, New York, NY, 2024

Gordon Research Conference: Single-cell cancer biology, Manchester, NH, 2024

Joint Mathematics Meetings, San Francisco, CA, 2024

Society for Mathematical Biology Annual Meeting, Columbus, OH, 2023

Mathematical and Computational Methods in Cancer and Biology Symposium, New York, NY, 2023

Gliwice Scientific Meetings, Gliwice, Poland, 2022

Cancer Grand Challenges Future Leaders, Barcelona, Spain, 2022

ECMTB - European Conference on Mathematical and Theoretical Biology, Heidelberg, Germany, 2022

Gordon Research Conference: Dissecting evolution and heterogeneity of single cancer cells, Easton, MA, 2022

ICRA9 - 9th international conference on risk analysis, Italy, 2022

ASH annual meeting & exposition, Orlando, FL, 2019

Multiscale cell fate symposium, Irvine, CA, 2018

Dynamics Days Europe, Loughborough, Britain, 2018

Joint Mathematics Meetings, San Diego, CA, 2018

BIOMATH conference, Kruger, South Africa, 2017

SIAM Conference on the life sciences, Boston, MA, 2016

SIAM-SEAS - Southeastern Atlantic section conference, Athens, GA, 2016

BIOT Conference - Biotechnology and Bioinformatics Symposium, Provo, UT, 2015

The 9th q-bio Conference, Blacksburg, VA, 2015

Symposium on Biomathematics and Ecology: Education and Research, Claremont, CA, 2014

Teaching experience

Department of Mathematics, University of Alabama

Spring 2018	**Math 112 (Pre-calculus and Algebra)**
Fall 2017	**Math 238 (Differential equations)**
Spring 2017	**Math 237 (Linear algebra)**
	Math 112 (Pre-calculus and Algebra)
Fall 2016	**Math 238 (Differential equations)**
	Math 115 (Pre-calculus, Algebra and Trigonometry)
Spring 2016	**Math 121 (Business calculus)**
Fall 2015	**Math 113 (Pre-calculus and Trigonometry)**
Spring 2015	**Math 112 (Pre-calculus and Algebra)**
Fall 2014	**Math 112 (Pre-calculus and Algebra)**