Kejun "Albert" Ying, Ph.D.

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Studying aging at the intersection of biology and AI

Education

Harvard University Cambridge, MA
Ph.D., Biological Science in Public Health July 2019 – May 2025

- Dissertation: "On the Quantification of Aging"
- Advisor: Dr. Vadim Gladyshev, Harvard Medical School, Brigham and Women's Hospital
- Dissertation Advisory Committee: Dr. Brendan Manning, Dr. David Sinclair, Dr. Shamil Sunyaev
- Focused on understanding the mechanism of aging through multi-omic modeling & causal inference
- Built the **first causality-enriched aging clock / current largest biological age database and agentic system (ClockBase, 2.5M+ samples) / first foundation model for the DNA methylome (MethylGPT)**

Harvard University Cambridge, MA
M.S., Computational Science Engineering July 2022 – May 2024

- Secondary field during Ph.D. study

University of California, Berkeley Berkeley, CA
Visiting Student, Integrative Biology Aug 2017 – Dec 2017

Sun Yat-Sen University Guangzhou, China
B.S., Life Science Sep 2015 – Jun 2019

- Thesis: Screening for the Interactome of hTERC based on Molecular Fluorescence Complementation System in Living Cells
- Yat-Sen Honor School Program (Top 0.5%)
- National college admissions exam (Top 0.6%)

Professional Experience

Stanford University & University of Washington Stanford, CA
Postdoctoral Researcher, Tony Wyss-Coray's Lab & David Baker's Lab (co-mentorship) Jun 2025 – Present

- Co-advised by Dr. Wyss-Coray and Baker under NIH/NIH F99/K00 Fellowship
- Focused on the *de novo* design of disaggregase to act against protein aggregation in neurons
- Building advanced aging clock and the foundation model for proteomic data

University of Washington Seattle, WA
Protein Design *Visiting Scholar, David Baker's Lab* Jan 2025 – May 2025

Stanford University Stanford, CA
Proteomics *Visiting Scholar, Tony Wyss-Coray's Lab* Nov 2024 – May 2025

Avinasi Labs San Francisco, CA
Decentralized longevity data collection *Co-founder* Jan 2025 – Present

Harvard Medical School, Brigham and Women's Hospital Boston, MA
Biological Aging *Graduate Researcher, Vadim Gladyshev's Lab* Mar 2020 – May 2025

Harvard Medical School, Boston Children's Hospital Boston, MA
RNA Modifications *Graduate Researcher (Rotation), Eric Greer's Lab* Jan 2020 – Mar 2020

Harvard Medical School Boston, MA
IPSC Reprogramming & DNA methylation *Graduate Researcher (Rotation), David Sinclair's Lab* Oct 2019 – Dec 2019

Harvard T. H. Chan School of Public Health Boston, MA
mTORC1 *Graduate Researcher (Rotation), Brendan Manning's Lab* July 2019 – Oct 2019

Undergraduate Research 2015 – 2019

- **Sun Yat-Sen University**, *Telomere & Telomerase* Zhou Songyang's Lab
- **University of Edinburgh**, *Population genetics* Xia Shen's Lab
- **University of Washington**, *Acarbose & Rapamycin* Matt Kaeberlein's Lab
- **Buck Institute for Research on Aging**, *Senolytics* Judith Campisi's Lab
- **University of California, Berkeley**, *SIRT7* Danica Chen's Lab
- **Sun Yat-Sen University**, *Telomere & DNA Methylation* Yikang Rong's Lab

Grants

Using causal aging biomarkers and protein design to develop novel anti-aging interventions NIH/NIA
F99/K00, *Transition to Aging Research for Predoctoral Students* 2024 – 2028

- Award Document Number: FAG088431A (PI)
- Received a *perfect* Impact Score of **10**

Publications

† Corresponding author; * Co-first author; + Contributed as consortium author

Ying, K., Paulson, S., Eames, A., Tyshkovskiy, A., ..., Gladyshev, V. N. (2025). *A Unified Framework for Systematic Curation and Evaluation of Aging Biomarkers*. **Nature Aging (in press)**. https://doi.org/10.1101/2023.12.02.569722

Jacques, E., Herzog, C., **Ying, K.,** ... Gladyshev, V. N. (2025). Invigorating discovery and clinical translation of aging biomarkers. **Nature Aging**, 1–5.

Gladyshev, V. N., Anderson, B., Barlit, H., ..., **Ying, K.,** Yunes, J., Zhang, B., & Zhavoronkov, A. (2024). Disagreement on foundational principles of biological aging. **PNAS Nexus**, *3*(12), pgae499. https://doi.org/10.1093/pnasnexus/pgae499

Goeminne, L. J. E., Vladimirova, A., Eames, A., Tyshkovskiy, A., Argentieri, M. A., **Ying, K.,** Moqri, M., & Gladyshev, V. N. (2025). Plasma protein-based organ-specific aging and mortality models unveil diseases as accelerated aging of organismal systems. **Cell Metabolism**, https://doi.org/10.1016/j.cmet.2024.03.007

Ying, K.† (2024). Causal inference for epigenetic ageing. **Nature Reviews Genetics**, 1–1. https://doi.org/10.1038/s41576-024-00799-7

Ying, K., Castro, J. P., Shindyapina, A. V., ..., Gladyshev, V. N. (2024). Depletion of loss-of-function germline mutations in centenarians reveals longevity genes. **Nature Communications**, *15*(1), 5956. https://doi.org/10.1038/s41467-024-50098-2

Lyu, YX.*, Fu, Q.*, Wilczok, D.*, **Ying, K.***, King, A., ..., Bakula, D. (2024). Longevity biotechnology: Bridging AI, biomarkers, geroscience and clinical applications for healthy longevity. **Aging**, *16*(1), 1–25. https://doi.org/10.18632/aging.205397

Biomarkers of Aging Consortium+, Herzog, C. M. S., Goeminne, L. J. E., Poganik, J. R., ..., Gladyshev, V. N. (2024). Challenges and recommendations for the translation of biomarkers of aging. **Nature Aging**, 1–12. https://doi.org/10.1038/s43587-024-00683-3

Castro, J. P., Shindyapina, A. V., Barbieri, A., **Ying, K.,** ..., Gladyshev, V. N. (2024). Age-associated clonal B cells drive B cell lymphoma in mice. **Nature Aging**, *4*(8), 1–15. https://doi.org/10.1038/s43587-024-00671-7

Moqri, M., ..., de Sena Brandine, G., **Ying, K.,** Tarkhov, A., ..., Sebastiano, V. (2024). PRC2-AgeIndex as a universal biomarker of aging and rejuvenation. **Nature Communications**, *15*(1), 5956. https://doi.org/10.1038/s41467-024-50098-2

Tarkhov, A. E., Lindstrom-Vautrin, T., Zhang, S., **Ying, K.,** Moqri, M., ..., Gladyshev, V. N. (2024). Nature of epigenetic aging from a single-cell perspective. **Nature Aging**, 1–17. https://doi.org/10.1038/s43587-023-00555-2

Moqri, M., Herzog, C., Poganik, J. R., **Ying, K.,**, ... Ferrucci, L. (2024). Validation of biomarkers of aging. **Nature Medicine**, 1–13. https://doi.org/10.1038/s41591-023-02784-9

Griffin, P. T., ..., Kerepesi, C., **Ying, K.,** ..., Sinclair, D. A. (2024). TIME-seq reduces time and cost of DNA methylation measurement for epigenetic clock construction. **Nature Aging**, 1–14. https://doi.org/10.1038/s43587-023-00555-2

Ying, K., Liu, H., Tarkhov, A. E., ..., Gladyshev, V. N. (2024). Causality-enriched epigenetic age uncouples damage and adaptation. **Nature Aging (Featured on the February Cover)**, 1–16. https://doi.org/10.1038/s43587-023-00557-0

Moqri, M., Herzog, C., Poganik, J. R., **Biomarkers of Aging Consortium**+, ... Gladyshev, V. N. (2023). Biomarkers of aging for the identification and evaluation of longevity interventions. **Cell**, *186*(18), 3758–3775. https://doi.org/10.1016/j.cell.2023.08.003

Liberman, N., Rothi, M. H., Gerashchenko, M. V., Zorbas, C., Boulias, K., MacWhinnie, F. G., **Ying, A. K.,** Flood Taylor, A., ..., Greer, E. L. (2023). 18S rRNA methyltransferases DIMT1 and BUD23 drive intergenerational hormesis. **Molecular Cell**, *83*(18), 3268–3282.e7. https://doi.org/10.1016/j.molcel.2023.08.014

Bitto, A., Grillo, A. S., Ito, T. K., Stanaway, I. B., Nguyen, B. M. G., **Ying, K.,** ... Kaeberlein, M. (2023). Acarbose suppresses symptoms of mitochondrial disease in a mouse model of Leigh syndrome. **Nature Metabolism**, *5*(6), 955–967. https://doi.org/10.1038/s42255-023-00815-w

Emmrich, S., Trapp, A., Tolibzoda Zakusilo, F., Straight, M. E., **Ying, A. K.,** Tyshkovskiy, A., ..., Gorbunova, V. (2022). Characterization of naked mole-rat hematopoiesis reveals unique stem and progenitor cell patterns and neotenic traits. **The EMBO Journal**, *41*(15), e109694. https://doi.org/10.15252/embj.2021109694

Yang, Z., ..., Guo, H., **Ying, K.,** Gustafsson, S., ..., Shen, X. (2022). Genetic Landscape of the ACE2 Coronavirus Receptor. **Circulation**, *145*(18), 1398–1411. https://doi.org/10.1161/CIRCULATIONAHA.121.057888

Ying, K., Zhai, R., Pyrkov, T. V., ..., Gladyshev, V. N. (2021). Genetic and phenotypic analysis of the causal relationship between aging and COVID-19. **Communications Medicine**, *1*(1), 35. https://doi.org/10.1038/s43856-021-00033-z

Li, T., Ning, Z., Yang, Z., Zhai, R., Zheng, C., Xu, W., Wang, Y., **Ying, K.,** Chen, Y., & Shen, X. (2021). Total genetic contribution assessment across the human genome. **Nature Communications**, *12*(1), 2845. https://doi.org/10.1038/s41467-021-23124-w

Zhu, J., Xu, M., Liu, Y., Zhuang, L., **Ying, K.,** Liu, F., ..., Songyang, Z. (2019). Phosphorylation of PLIN3 by AMPK promotes dispersion of lipid droplets during starvation. **Protein & Cell**, *10*(5), 382–387. https://doi.org/10.1007/s13238-018-0593-9

Preprints

Zhang, O., ..., Wang, J., **Ying, K.,** Kang, Y., Hsieh, C.-y., & Hou, T. (2025). *Graph Neural Networks in Modern AI-aided Drug Discovery*. **arXiv**. https://arxiv.org/abs/2506.06915

Ying, K.†**,** Song, J., Cui, H., ..., Gladyshev, V. N. (2024). MethylGPT: a foundation model for the DNA methylome. **bioRxiv**. https://doi.org/10.1101/2024.10.30.621013

Ying, K., Paulson, S., Reinhard, J., ..., Gladyshev, V. N. (2024). An Open Competition for Biomarkers of Aging. **bioRxiv**. https://doi.org/10.1101/2024.10.29.620782

Ying, K., Tyshkovskiy, A., Chen, Q., ..., Gladyshev, V. N. (2024). High-dimensional Ageome Representations of Biological Aging across Functional Modules. **bioRxiv**. https://doi.org/10.1101/2024.09.21.570935

Galkin, F., ..., Tyshkovskiy, A., **Ying, K.,** Gladyshev, V. N., & Zhavoronkov, A. (2024). Precious3GPT: Multimodal Multi-Species Multi-Omics Multi-Tissue Transformer for Aging Research and Drug Discovery. **bioRxiv**. https://doi.org/10.1101/2024.07.25.605062

Tyshkovskiy, A., Kholdina, D., **Ying, K.,** Davitadze, M., ..., Gladyshev, V. N. (2024). Transcriptomic Hallmarks of Mortality Reveal Universal and Specific Mechanisms of Aging, Chronic Disease, and Rejuvenation. **bioRxiv**. https://doi.org/10.1101/2024.07.04.601982

Rothi, M. H., Sarkar, G. C., Al Haddad, J., Mitchell, W., **Ying, K.,** Pohl, N., ..., Greer, E. L. (2024). The 18S rRNA Methyltransferase DIMT-1 Regulates Lifespan in the Germline Later in Life. **bioRxiv**. https://doi.org/10.1101/2024.05.15.570935

Moqri, M., Poganik, J. R., Herzog, C., **Ying, K.,** Chen, Q., ..., Gladyshev, V. N. (2024). Integrative epigenetics and transcriptomics identify aging genes in human blood. **bioRxiv**. https://doi.org/10.1101/2024.05.30.596713

Ying, K., Tyshkovskiy, A., Trapp, A., ..., Gladyshev, V. N. (2023). *ClockBase : A comprehensive platform for biological age profiling in human and mouse*. **bioRxiv**. https://doi.org/10.1101/2023.02.28.530532

Zhang, B., Tarkhov, A. E., Ratzan, W., **Ying, K.,** Moqri, M., ..., Gladyshev, V. N. (2022). *Epigenetic profiling and incidence of disrupted development point to gastrulation as aging ground zero in Xenopus laevis*. **bioRxiv**. https://doi.org/10.1101/2022.08.02.502559

Patents

V. N. Gladyshev, **K. Ying**, "High-dimensional measurement of biological age" (2024). *Provisional Patent Application*

V. N. Gladyshev, **K. Ying**, "Mapping CpG sites to quantify aging traits" (2024). *WO2024039905A2*

Software and Database

MethylGPT (2024) https://github.com/MethylGPT/MethylGPT

Biolearn (2024) https://bio-learn.github.io/

ClockBase (2023) https://www.clockbase.org/

Presentations

Oral Presentations

Keystone Symposia: Aging: New Frontiers in Rejuvenation and Gerotherapeutics — Breckenridge, CO
MethylGPT: A Foundation Model for the DNA Methylome — 2025

Biomarkers of Aging Symposium — Boston, MA
Standardization of aging biomarkers and BoA challenge — 2024

Harvard GRIP Presentations — Boston, MA
Causal Aging Biomarker enpowers Unbiased Anti-Aging Therapy Screening — 2024

4th TimePie Longevity Forum — Shanghai, China
Causal Aging Biomarker as a Tool for Unbiased Anti-Aging Therapy Screening — 2023

Global Congress on Aesthetic and Anti-Aging (GCAA2023) — Singapore
Causal Aging Biomarker as a Tool for Unbiased Anti-Aging Therapy Screening — 2023

10th Aging Research and Drug Discovery conference (ARDD2023) — Copenhagen, Denmark
Causal Epigenetic Age Uncouples Damage and Adaptation — 2023

AGE 2023 51st Annual Meeting — Oklahoma City, OK
Causal Epigenetic Age Uncouples Damage and Adaptation — 2023

Broad Institute MPG Retreat — Cambridge, MA
Causal Epigenetic Age Uncouples Damage and Adaptation — 2023

Harvard GRIP Presentations — Boston, MA
Causal Epigenetic Age Uncouples Damage and Adaptation — 2022

Targeting Metabesity 2022, 'Honorable Mention' — Virtual Conference
Causal Epigenetic Age Uncouples Damage and Adaptation — 2022

GSA 2021 Annual Scientific Meeting — Virtual Conference
Genetic and phenotypic evidence for causal relationships between aging and COVID-19 — 2021

Invited Talks

St. Jude Children's Research Hospital, hosted by Dr. Zhaoming Wang — Memphis, TN
MethylGPT and Causality-enriched Epigenetic Clock — 2025

The Alliance for Longevity Initiatives Scientist Spotlight, — Online Podcast
Episode 14: Albert Ying — 2024

BioAge Seminar, hosted by Dr. Robert Hughes & Dr. Paul Timmers — Boston, MA
Ageome: Biological age with higher-dimensionality — 2024

MRC Integrative Epidemiology Unit Seminar — Bristol, UK
Epigenetic Clocks and Mendelian Randomization — 2024

NIA EL Projects Joint Meeting, National Institute on Aging — Online Webinar
Aging Clocks — 2024

Biomarkers of Aging Challenge, Foresight Institute — Online Webinar
Update Webinar with Foresight — 2024

Everything Epigenetics, podcast hosted by Hannah Went — Online Podcast
Causal Epigenetic Age Uncouples Damage and Adaptation — 2024

Chinese University of Hong Kong, hosted by Dr. Xin Wang — Hong Kong, China
Causal Aging Biomarker as a Tool for Systemic Anti-Aging Therapy Screening — 2024

Everything Epigenetics, podcast hosted by Hannah Went — Online Podcast
Causal Epigenetic Age Uncouples Damage and Adaptation — 2023

Chinese University of Hong Kong, hosted by Dr. Xin Wang — Hong Kong, China
Causal Aging Biomarker as a Tool for Systemic Anti-Aging Therapy Screening — 2023

Peking University, hosted by Dr. Jingdong Han — Beijing, China
Causal Aging Biomarker and ClockBase — 2023

Chinese Academy of Sciences, hosted by Dr. Xuming Zhou — Beijing, China
Causal Epigenetic Age Uncouples Damage and Adaptation — 2022

Foresight Institute, hosted by Allison Duettmann — Online Seminar
Genetic Variation, Aging & Relationship to COVID-19 | Joris Deelen, Albert Ying — 2020

Honors

Semifinalist, Harvard President's Innovation Challenge, Health Care and Life Sciences Track — 2025

Best Poster Award, Inaugural Biomarker of Aging Symposium — 2023

Best Poster Award, Gordon Research Conference, Systems Aging — 2022

Hackathon Winner, Longevity Hackathon, VitaDAO — 2021

Yan-Sen Honor School Program, Sun Yat-Sen University — 2016 – 2019

Yan-Sen Scholarship, Sun Yat-Sen University — 2016 – 2019

Professional Experience

Service & Leadership

Core Member, Biomarkers of Aging Consortium — 2024 – Present

Organizer, Biomarker of Aging Challenge — 2024 – Present

President, Harvard Interdisciplinary Discussion on Disease and Health — 2024 – 2025

Organizing Committee Member, Biomarker of Aging Symposium 2024 — 2024

Organizing Committee Member, Biomarker of Aging Symposium 2023 — 2023

Teaching & Mentoring

Mentor, Yuanpei Young Scholars Program — 2023 – 2024

Instructor, Harvard Public Health Symposium For Young Generation — 2023

Students Supervised

Predoctoral Students: Ali Doga Yucel, Siyuan Li, Hanna Liu, Donghyun Lee, Yikun Zhang

Journals Reviewed

Nature Aging, *Nature Communications*, *BMC Nephrology*, *Lipids in Health and Disease*, *Clinical Proteomics*, *Evidence-Based Complementary and Alternative Medicine*, *Scientific Report*

References

Dr. Tony Wyss-Coray, Postdoctoral Co-Advisor twc@stanford.edu
D.H. Chen Distinguished Professor of Neurology and Neurological Sciences, Stanford University

Dr. David Baker, Postdoctoral Co-Advisor dbaker@uw.edu
Professor of Biochemistry, University of Washington

Dr. Vadim Gladyshev, Dissertation Advisor vgladyshev@bwh.harvard.edu
Professor of Medicine, Harvard Medical School

Dr. Steve Horvath, Collaborator shorvath@mednet.ucla.edu
Professor of Human Genetics, UCLA

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Professor of Genetics, Harvard Medical School

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Professor of Pathology, University of Washington