Kejun "Albert" Ying

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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 2019 – Expected May 2025

- 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

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

- Secondary field during Ph.D. study

University of California, Berkeley Berkeley, CA
Visiting Student, Integrative Biology 2017 – 2018

Sun Yat-Sen University Guangzhou, China
B.S., Life Science 2015 – 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%)

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

Castro, J. P., Shindyapina, A. V., Barbieri, A., **Ying, K.,** Strelkova, O. S., Paulo, J. A., Tyshkovskiy, A., Meinl, R., Kerepesi, C., Petrashen, A. P., Mariotti, M., Meer, M., Hu, Y., Karamyshev, A., Losyev, G., Galhardo, M., Logarinho, E., Indzhykulian, A. A., Gygi, S. P., Sedivy, J. M., Manis, J. P., & Gladyshev, V. N. (2024). Age-associated clonal B cells drive B-cell lymphoma in mice. **Nature Aging**, in press.

Moqri, M., Cipriano, A., Simpson, D. J., Rasouli, S., Murty, T., de Jong, T. A., Nachun, D., de Sena Brandine, G., **Ying, K.,** Tarkhov, A., Aberg, K. A., van den Oord, E., Zhou, W., Smith, A., Mackall, C., Gladyshev, V. N., Horvath, S., Snyder, M. P., & Sebastiano, V. (2024). PRC2-AgeIndex as a universal biomarker of aging and rejuvenation. **Nature Communications**, in press.

Tarkhov, A. E., Lindstrom-Vautrin, T., Zhang, S., **Ying, K.,** Moqri, M., Zhang, B., Tyshkovskiy, A., Levy, O., & 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.,** Justice, J. N., Belsky, D. W., Higgins-Chen, A. T., Chen, B. H., Cohen, A. A., Fuellen, G., Hägg, S., Marioni, R. E., Widschwendter, M., Fortney, K., Fedichev, P. O., Zhavoronkov, A., Barzilai, N., Lasky-Su, J., Kiel, D. P., … Ferrucci, L. (2024). Validation of biomarkers of aging. **Nature Medicine**, 1–13. https://doi.org/10.1038/s41591-023-02784-9

Griffin, P. T., Kane, A. E., Trapp, A., Li, J., Arnold, M., Poganik, J. R., Conway, R. J., McNamara, M. S., Meer, M. V., Hoffman, N., Amorim, J. A., Tian, X., MacArthur, M. R., Mitchell, S. J., Mueller, A. L., Carmody, C., Vera, D. L., 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., Sadler, M. C., Lu, A. T., Moqri, M., Horvath, S., Kutalik, Z., Shen, X., & 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

Liberman, N., Rothi, M. H., Gerashchenko, M. V., Zorbas, C., Boulias, K., MacWhinnie, F. G., **Ying, A. K.,** Flood Taylor, A., Al Haddad, J., Shibuya, H., Roach, L., Dong, A., Dellacona, S., Lafontaine, D. L. J., Gladyshev, V. N., & 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.,** Tung, H., Smith, K., Tran, N., Velikanje, G., Urfer, S. R., Snyder, J. M., Barton, J., Sharma, A., Kayser, E.-B., Wang, L., Smith, D. L., Thompson, J. W., DuBois, L., … 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., Mariotti, M., Gray, S., Zhang, Z., Drage, M. G., Takasugi, M., Klusmann, J.-H., Gladyshev, V. N., Seluanov, 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., Macdonald-Dunlop, E., Chen, J., Zhai, R., Li, T., Richmond, A., Klarić, L., Pirastu, N., Ning, Z., Zheng, C., Wang, Y., Huang, T., He, Y., Guo, H., **Ying, K.,** Gustafsson, S., Prins, B., Ramisch, A., Dermitzakis, E. T., … 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., Shindyapina, A. V., Mariotti, M., Fedichev, P. O., Shen, X., & 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

Bitto, A., Tung, H., **Ying, K.,** Smith, D. L., Kayser, E.-B., Morgan, P. G., Sedensky, M. M., & Kaeberlein, M. (2019). AGING AND MITOCHONDRIAL DISEASE: SHARED MECHANISMS AND THERAPIES? **Innovation in Aging**, *3*(Supplement_1), S395–S395. https://doi.org/10.1093/geroni/igz038.1459

Zhu, J., Xu, M., Liu, Y., Zhuang, L., **Ying, K.,** Liu, F., Liu, D., Ma, W., & 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

Tyshkovskiy, A., Kholdina, D., **Ying, K.,** Davitadze, M., Molière, A., Tongu, Y., Kasahara, T., Kats, L. M., Vladimirova, A., Moldakozhayev, A., Liu, H., Zhang, B., Khasanova, U., Moqri, M., Van Raamsdonk, J. M., Harrison, D. E., Strong, R., Abe, T., Dmitriev, S. E., & 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., Sotomayor-Mena, R. G., Natale, J., Dellacono, S., Gladyshev, V. 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., Emamifar, M., Tyshkovskiy, A., Eames, A. W., Mur, J., Matei-Dediu, B., Goeminne, L., Mitchell, W., McCartney, D. L., Marioni, R. L., Lasky-Su, J. A., Snyder, M., & Gladyshev, V. N. (2024). Integrative epigenetics and transcriptomics identify aging genes in human blood. **bioRxiv**. https://doi.org/10.1101/2024.05.30.596713

Goeminne, L. J. E., Eames, A., Tyshkovskiy, A., Argentieri, M. A., **Ying, K.,** Moqri, M., & Gladyshev, V. N. (2024). Plasma-based organ-specific aging and mortality models unveil diseases as accelerated aging of organismal systems. **medRxiv**. https://doi.org/10.1101/2024.04.08.24305469

Ying, K., Paulson, S., Perez-Guevara, M., Emamifar, M., Martinez, M. C., Kwon, D., Poganik, J. R., Moqri, M., & Gladyshev, V. N. (2023). *Biolearn, an open-source library for biomarkers of aging*. **bioRxiv**. https://doi.org/10.1101/2023.12.02.569722

Ying, K., Tyshkovskiy, A., Trapp, A., Liu, H., Moqri, M., Kerepesi, C., & 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., Poganik, J. R., Barre, B., Trapp, A., Zoller, J. A., Haghani, A., Horvath, S., Peshkin, L., & 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

Castro, J. P., Shindyapina, A. V., Barbieri, A., **Ying, K.,** Strelkova, O. S., Paulo, J. A., Tyshkovskiy, A., Meinl, R., Kerepesi, C., Petrashen, A. P., Mariotti, M., Meer, M., Hu, Y., Karamyshev, A., Losyev, G., Indzhykulian, A. A., Gygi, S. P., Sedivy, J. M., Manis, J. P., & Gladyshev, V. N. (2021). *Integrative analyses uncover mechanisms by which aging drives B cell lymphoma*. **bioRxiv**. https://doi.org/10.1101/2021.02.23.432500

Patents

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

Software and Database

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

ClockBase (2023) <www.clockbase.com>

Presentations

Oral Presentations

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

Poster Presentations

Biomarker of Aging Symposium — Novato, CA
Causal Aging Biomarker as a Tool for Unbiased Anti-Aging Therapy Screening — 2023

Gordon Research Conference, Systems Aging — Maine, MA
Causal Epigenetic Age Uncouples Damage and Adaptation — 2022

Invited Talks

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

Research Experience

Harvard Medical School, Brigham and Women's Hospital — Boston, MA
Graduate Researcher, Vadim Gladyshev's Lab — 2020 – Present

Harvard Medical School, Boston Children's Hospital — Boston, MA
Rotation Student, Eric Greer's Lab — 2020

Harvard Medical School — Boston, MA
Rotation Student, David Sinclair's Lab — 2019

Harvard T. H. Chan School of Public Health — Boston, MA
Rotation Student, Brendan Manning's Lab — 2019

Sun Yat-Sen University — Guangzhou, China
Undergraduate Researcher, Zhou Songyang's Lab — 2018 – 2019

University of Edinburgh — Edinburgh, UK
Undergraduate Researcher, Xia Shen's Lab — 2018

University of Washington — Seattle, WA
Undergraduate Researcher, Matt Kaeberlein's Lab — 2018

Buck Institute for Research on Aging — Novato, CA
Undergraduate Researcher, Judith Campisi's Lab — 2018

University of California, Berkeley — Berkeley, CA
Undergraduate Researcher, Danica Chen's Lab — 2017

Sun Yat-Sen University — Guangzhou, China
Undergraduate Researcher, Yikang Rong's Lab — 2015 – 2017

Honors

Best Poster Award, Inaugural Biomarker of Aging Symposium — 2023

Student Spotlight, Harvard Chan School of Public Health — 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

President, Harvard Interdisciplinary Discussion on Disease and Health 2024 – Present

Advisory Committee Member, Massachusetts Community Health & Healthy Aging Funds 2024 – Present

Organizing Committee Member, Biomarker of Aging Symposium 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, Han Weng

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. 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

Dr. David Sinclair, Dissertation Advisory Committee david_sinclair@hms.harvard.edu
Professor of Genetics, Harvard Medical School

Dr. Matt Kaeberlein, Advisor kaeber@uw.edu
Professor of Pathology, University of Washington