# 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. V., 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**, *4*(8), 1–15. https://doi.org/10.1038/s43587-024-00671-7

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**, *15*(1), 5956. https://doi.org/10.1038/s41467-024-50098-2

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

Moqri, M., Herzog, C., Poganik, J. R., **Biomarkers of Aging Consortium** Justice, J., Belsky, D. W., Higgins-Chen, A., Moskalev, A., Fuellen, G., Cohen, A. A., Bautmans, I., Widschwendter, M., Ding, J., Fleming, A., Mannick, J., Han, J.-D. J., Zhavoronkov, A., Barzilai, N., Kaeberlein, M., … 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 **Contributed as consortium author*

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

Galkin, F., Naumov, V., Pushkov, S., Sidorenko, D., Urban, A., Zagirova, D., Alawi, K. M., Aliper, A., Gumerov, R., Kalashnikov, A., Mukba, S., Pogorelskaya, A., Ren, F., Shneyderman, A., Tang, Q., Xiao, D., 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

**Ying, K.,** Paulson, S., Eames, A., Tyshkovskiy, A., Li, S., Perez-Guevara, M., Emamifar, M., Martínez, M. C., Kwon, D., Kosheleva, A., Snyder, M. P., Gobel, D., Herzog, C., Poganik, J. R., Biomarker of Aging Consortium, Moqri, M., & Gladyshev, V. N. (2024). *A Unified Framework for Systematic Curation and Evaluation of Aging Biomarkers*. **bioRxiv**. https://doi.org/10.1101/2023.12.02.569722

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.,** 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) https://www.clockbase.org/

## 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