



Shripad Tuljapurkar

The Dean and Virginia Morrison Professor of Population Studies
Biology

Bio

ACADEMIC APPOINTMENTS

- Professor, Biology
- Member, Bio-X
- Affiliate, Stanford Woods Institute for the Environment

ADMINISTRATIVE APPOINTMENTS

- Director, Stanford Center for Population Research, (2010-2015)
- Director, Demography Core, Center for Demography and Economics of Health and Aging, (2009-2014)

LINKS

- My own lab site: <http://popstudies.stanford.edu>

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Shripad Tuljapurkar is Professor of Biology and the Dean & Virginia Morrison Professor of Population Studies at Stanford University. His research areas include stochastic dynamics of human and natural populations; life history evolution, especially senescence; prehistoric societies; and probability forecasts including sex ratios, mortality, aging and fiscal balance.

Tuljapurkar directs Stanford's Center for Population Research and the demography program at Stanford's Center for the Demography and Economics of Health and Aging. He is a member of the Center for the Demography and Economics of Aging at the University of California, Berkeley. He has led a panel on aging for the International Union for the Scientific Study of Population and served on the Technical Advisory Panel to the US Social Security Administration. He received the 1996 Mindel Sheps Award from the Population Association of America, and a John Simon Guggenheim Fellowship in 1998.

Teaching

COURSES

2016-17

- Matrix Methods for Dynamic Models and Data Analysis: BIO 329 (Aut)
- Stochastic Methods for Simulation, Dynamics and Data Analysis: BIO 330 (Win)

2015-16

- Essential Statistics for Human Biology: BIO 108, HUMBIO 85A (Spr)

STANFORD ADVISEES

Doctoral Dissertation Advisor (AC)

Diana Rypkema

Doctoral (Program)

Diana Rypkema

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Biology (School of Humanities and Sciences) (Phd Program)

Publications

PUBLICATIONS

- **Des différences, pourquoi? Transmission, maintenance and effects of phenotypic variance.** *journal of animal ecology*
Plard, F., Gaillard, J., Coulson, T., Tuljapurkar, S.
2016; 85 (2): 356-370
- **Limitations of GCTA as a solution to the missing heritability problem** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Kumar, S. K., Feldman, M. W., Rehkopf, D. H., Tuljapurkar, S.
2016; 113 (1): E61-E70
- **Deciphering life history transcriptomes in different environments** *MOLECULAR ECOLOGY*
Etges, W. J., Trotter, M. V., de Oliveira, C. C., Rajpurohit, S., Gibbs, A. G., Tuljapurkar, S.
2015; 24 (1): 151-179
- **Generation time, net reproductive rate, and growth in stage-age-structured populations.** *American naturalist*
Steiner, U. K., Tuljapurkar, S., Coulson, T.
2014; 183 (6): 771-783
- **Divergence in age patterns of mortality change drives international divergence in lifespan inequality.** *Demography*
Gillespie, D. O., Trotter, M. V., Tuljapurkar, S. D.
2014; 51 (3): 1003-1017
- **Neutral theory for life histories and individual variability in fitness components** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Steiner, U. K., Tuljapurkar, S.
2012; 109 (12): 4684-4689
- **Dynamic heterogeneity and life histories** *Workshop on Reproductive Aging*
Tuljapurkar, S., Steiner, U. K.
WILEY-BLACKWELL.2010: 65-72
- **Inequality in life spans and a new perspective on mortality convergence across industrialized countries** *POPULATION AND DEVELOPMENT REVIEW*
Edwards, R. D., Tuljapurkar, S.
2005; 31 (4): 645-?
- **Population forecasting for fiscal planning: Issues and innovations** *Conference on Demographic Change and Fiscal Policy*
LEE, R., Tuljapurkar, S.
CAMBRIDGE UNIV PRESS.2001: 7-72
- **STOCHASTIC POPULATION FORECASTS FOR THE UNITED-STATES - BEYOND HIGH, MEDIUM, AND LOW** *JOURNAL OF THE AMERICAN STATISTICAL ASSOCIATION*
Lee, R. D., Tuljapurkar, S.
1994; 89 (428): 1175-1189

- **Demographic and clinical profiles of *Plasmodium falciparum* and *Plasmodium vivax* patients at a tertiary care centre in southwestern India** *MALARIA JOURNAL*
Chery, L., Maki, J. N., Mascarenhas, A., Walke, J. T., Gawas, P., Almeida, A., Fernandes, M., Vaz, M., Ramanan, R., Shirodkar, D., Bernabeu, M., Manoharan, S. K., Pereira, et al
2016; 15
- **Racial and Socioeconomic Variation in Genetic Markers of Telomere Length: A Cross-Sectional Study of U.S. Older Adults.** *EBioMedicine*
Hamad, R., Tuljapurkar, S., Rehkopf, D. H.
2016; 11: 296-301
- **Reply to Yang et al.: GCTA produces unreliable heritability estimates.** *Proceedings of the National Academy of Sciences of the United States of America*
Krishna Kumar, S., Feldman, M. W., Rehkopf, D. H., Tuljapurkar, S.
2016; 113 (32): E4581-?
- **Distinct genomic architecture of *Plasmodium falciparum* populations from South Asia.** *Molecular and biochemical parasitology*
Kumar, S., Mudeppa, D. G., Sharma, A., Mascarenhas, A., Dash, R., Pereira, L., Shaik, R. B., Maki, J. N., White, J., Zuo, W., Tuljapurkar, S., Duraisingh, M. T., Gomes, et al
2016
- **Linking demographic responses and life history tactics from longitudinal data in mammals** *OIKOS*
Gamelon, M., Gaillard, J., Gimenez, O., Coulson, T., Tuljapurkar, S., Baubet, E.
2016; 125 (3): 395-404
- **The effects of asymmetric competition on the life history of Trinidadian guppies** *ECOLOGY LETTERS*
Bassar, R. D., Childs, D. Z., Rees, M., Tuljapurkar, S., Reznick, D. N., Coulson, T.
2016; 19 (3): 268-278
- **Sex-specific demography and generalization of the Trivers-Willard theory.** *Nature*
Schindler, S., Gaillard, J., Grüning, A., Neuhaus, P., Traill, L. W., Tuljapurkar, S., Coulson, T.
2015; 526 (7572): 249-252
- **Quantifying the influence of measured and unmeasured individual differences on demography** *JOURNAL OF ANIMAL ECOLOGY*
Plard, F., Gaillard, J., Coulson, T., Delorme, D., Warnant, C., Michallet, J., Tuljapurkar, S., Krishnakumar, S., Bonenfant, C.
2015; 84 (5): 1434-1445
- **Measuring selective constraint on fertility in human life histories** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Jones, J. H., Tuljapurkar, S.
2015; 112 (29): 8982-8986
- **Influence of Life-History Tactics on Transient Dynamics: A Comparative Analysis across Mammalian Populations** *AMERICAN NATURALIST*
Gamelon, M., Gimenez, O., Baubet, E., Coulson, T., Tuljapurkar, S., Gaillard, J.
2014; 184 (5): 673-683
- **Influence of life-history tactics on transient dynamics: a comparative analysis across mammalian populations.** *American naturalist*
Gamelon, M., Gimenez, O., Baubet, E., Coulson, T., Tuljapurkar, S., Gaillard, J.
2014; 184 (5): 673-683
- **Birth-order differences can drive natural selection on aging.** *Evolution; international journal of organic evolution*
Gillespie, D. O., Trotter, M. V., Krishna-Kumar, S., Tuljapurkar, S. D.
2014; 68 (3): 886-892
- **The invisible cliff: abrupt imposition of malthusian equilibrium in a natural-fertility, agrarian society.** *PloS one*
Puleston, C., Tuljapurkar, S., Winterhalder, B.
2014; 9 (1)
- **Defoliation and bark harvesting affect life-history traits of a tropical tree** *JOURNAL OF ECOLOGY*
Gaoue, O. G., Horvitz, C. C., Ticktin, T., Steiner, U. K., Tuljapurkar, S.
2013; 101 (6): 1563-1571

- **Contributions of Covariance: Decomposing the Components of Stochastic Population Growth in *Cypridium calceolus*** *AMERICAN NATURALIST*
Davison, R., Nicole, F., Jacquemyn, H., Tuljapurkar, S.
2013; 181 (3): 410-420
- **Beyond the mean: sensitivities of the variance of population growth** *METHODS IN ECOLOGY AND EVOLUTION*
Trotter, M. V., Krishna-Kumar, S., Tuljapurkar, S.
2013; 4 (3): 290-298
- **Structured Population Models: Introduction** *THEORETICAL POPULATION BIOLOGY*
Tuljapurkar, S., Coulson, T., Steiner, U. K.
2012; 82 (4): 241-243
- **Linking the population growth rate and the age-at-death distribution** *THEORETICAL POPULATION BIOLOGY*
Schindler, S., Tuljapurkar, S., Gaillard, J., Coulson, T.
2012; 82 (4): 244-252
- **Editorial for the Special Issue: Biodemographic determinants of lifespan** *EXPERIMENTAL GERONTOLOGY*
Carey, J. R., Tuljapurkar, S., Wachter, K.
2012; 47 (10): 755-758
- **Building and testing models of long-term agricultural intensification and population dynamics: A case study from the Leeward Kohala Field System, Hawai'i** *ECOLOGICAL MODELLING*
Kirch, P. V., Asner, G., Chadwick, O. A., Field, J., LADEFOGED, T., Lee, C., Puleston, C., Tuljapurkar, S., Vitousek, P. M.
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- **Stochastic LTRE analysis of the effects of herbivory on the population dynamics of a perennial grassland herb** *OIKOS*
Jacquemyn, H., Brys, R., Davison, R., Tuljapurkar, S., Jongejans, E.
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- **Derivatives of the stochastic growth rate** *THEORETICAL POPULATION BIOLOGY*
Steinsaltz, D., Tuljapurkar, S., Horvitz, C.
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- **Variance in death and its implications for modeling and forecasting mortality** *DEMOGRAPHIC RESEARCH*
Tuljapurkar, S., Edwards, R. D.
2011; 24: 497-525
- **Demography as the Human Story** *POPULATION AND DEVELOPMENT REVIEW*
Tuljapurkar, S.
2011; 37 (1): 166-171
- **Static and dynamic expression of life history traits in the northern fulmar *Fulmarus glacialis*** *OIKOS*
Orzack, S. H., Steiner, U. K., Tuljapurkar, S., Thompson, P.
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- **A NEW WAY TO INTEGRATE SELECTION WHEN BOTH DEMOGRAPHY AND SELECTION GRADIENTS VARY OVER TIME** *INTERNATIONAL JOURNAL OF PLANT SCIENCES*
Horvitz, C. C., Coulson, T., Tuljapurkar, S., Schemske, D. W.
2010; 171 (9): 945-959
- **Using evolutionary demography to link life history theory, quantitative genetics and population ecology** *JOURNAL OF ANIMAL ECOLOGY*
Coulson, T., Tuljapurkar, S., Childs, D. Z.
2010; 79 (6): 1226-1240
- **Coupled dynamics of body mass and population growth in response to environmental change** *NATURE*
Ozgul, A., Childs, D. Z., Oli, M. K., Armitage, K. B., Blumstein, D. T., Olson, L. E., Tuljapurkar, S., Coulson, T.
2010; 466 (7305): 482-U5
- **Plant populations track rather than buffer climate fluctuations** *ECOLOGY LETTERS*
Jongejans, E., De Kroon, H., Tuljapurkar, S., Shea, K.

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- **Dynamic heterogeneity and life history variability in the kittiwake** *JOURNAL OF ANIMAL ECOLOGY*
Steiner, U. K., Tuljapurkar, S., Orzack, S. H.
2010; 79 (2): 436-444
- **Demographic effects of extreme weather events on a short-lived calcareous grassland species: stochastic life table response experiments** *JOURNAL OF ECOLOGY*
Davison, R., Jacquemyn, H., Adriaens, D., Honnay, O., De Kroon, H., Tuljapurkar, S.
2010; 98 (2): 255-267
- **Environmental variance, population growth and evolution** *JOURNAL OF ANIMAL ECOLOGY*
Tuljapurkar, S.
2010; 79 (1): 1-3
- **Population and prehistory III: Food-dependent demography in variable environments** *THEORETICAL POPULATION BIOLOGY*
Lee, C. T., Puleston, C. O., Tuljapurkar, S.
2009; 76 (3): 179-188
- **A time to grow and a time to die: a new way to analyze the dynamics of size, light, age, and death of tropical trees** *ECOLOGY*
Metcalf, C. J., Horvitz, C. C., Tuljapurkar, S., Clark, D. A.
2009; 90 (10): 2766-2778
- **DEMOGRAPHY Babies make a comeback** *NATURE*
Tuljapurkar, S.
2009; 460 (7256): 693-694
- **Estimating stochastic elasticities directly from longitudinal data** *ECOLOGY LETTERS*
Haridas, C. V., Tuljapurkar, S., Coulson, T.
2009; 12 (8): 806-812
- **The Dynamics of Phenotypic Change and the Shrinking Sheep of St. Kilda** *SCIENCE*
Ozgul, A., Tuljapurkar, S., Benton, T. G., Pemberton, J. M., Clutton-Brock, T. H., Coulson, T.
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- **From stochastic environments to life histories and back** *PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY B-BIOLOGICAL SCIENCES*
Tuljapurkar, S., Gaillard, J., Coulson, T.
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- **Hierarchical demography: a general approach with an application to honey bees** *ECOLOGY*
Al-Khafaji, K., Tuljapurkar, S., Carey, J. R., Page, R. E.
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- **Dynamic heterogeneity in life histories** *ECOLOGY LETTERS*
Tuljapurkar, S., Steiner, U. K., Orzack, S. H.
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- **Evolution of Delayed Reproduction in Uncertain Environments: A Life-History Perspective** *AMERICAN NATURALIST*
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- **The Dynamics of a Quantitative Trait in an Age-Structured Population Living in a Variable Environment** *AMERICAN NATURALIST*
Coulson, T., Tuljapurkar, S.
2008; 172 (5): 599-612
- **How can economic schemes curtail the increasing sex ratio at birth in China?** *DEMOGRAPHIC RESEARCH*
Bhattacharjya, D., Sudarshan, A., Tuljapurkar, S., Shachter, R., Feldman, M.
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- **Population and prehistory II: Space-limited human populations in constant environments** *THEORETICAL POPULATION BIOLOGY*
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- **Stage dynamics, period survival, and mortality plateaus** *AMERICAN NATURALIST*
Horvitz, C. C., Tuljapurkar, S.
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- **Senescence rates are determined by ranking on the fast-slow life-history continuum** *ECOLOGY LETTERS*
Jones, O. R., Gaillard, J., Tuljapurkar, S., Alho, J. S., Armitage, K. B., Becker, P. H., Bize, P., Brommer, J., Charmantier, A., Charpentier, M., Clutton-Brock, T., Dobson, F. S., Festa-Bianchet, et al
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- **Population and prehistory I: Food-dependent population growth in constant environments** *THEORETICAL POPULATION BIOLOGY*
Lee, C. T., Tuljapurkar, S.
2008; 73 (4): 473-482
- **Longevity can buffer plant and animal populations against changing climatic variability** *ECOLOGY*
Morris, W. F., Pfister, C. A., Tuljapurkar, S., Haridas, C. V., Boggs, C. L., Boyce, M. S., Bruna, E. M., Church, D. R., Coulson, T., Doak, D. F., Forsyth, S., Gaillard, J., Horvitz, et al
2008; 89 (1): 19-25
- **Time, transients and elasticity** *ECOLOGY LETTERS*
Haridas, C. V., Tuljapurkar, S.
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- **Detecting variability in demographic rates: randomization with the Kullback-Leibler distance** *JOURNAL OF ECOLOGY*
Al-Khafaji, K., Tuljapurkar, S., Horvitz, C., Koop, A.
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- **Why Men Matter: Mating Patterns Drive Evolution of Human Lifespan** *PLOS ONE*
Tuljapurkar, S. D., Puleston, C. O., Gurven, M. D.
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- **The evolutionary demography of ecological change: Linking trait variation and population growth** *SCIENCE*
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- **Sensitivity of the population growth rate to demographic variability within and between phases of the disturbance cycle** *ECOLOGY LETTERS*
Morris, W. F., Tuljapurkar, S., Haridas, C. V., Menges, E. S., Horvitz, C. C., Pfister, C. A.
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- **Risky business: Temporal and spatial variation in preindustrial dryland agriculture** *HUMAN ECOLOGY*
Lee, C. T., Tuljapurkar, S., Vitousek, P. M.
2006; 34 (6): 739-763
- **From stage to age in variable environments: Life expectancy and survivorship** *ECOLOGY*
Tuljapurkar, S., Horvitz, C. C.
2006; 87 (6): 1497-1509
- **Temporal autocorrelation and stochastic population growth** *ECOLOGY LETTERS*
Tuljapurkar, S., Haridas, C. V.
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- **Temporal autocorrelation and stochastic population growth.** *Ecology letters*
Tuljapurkar, S., Haridas, C. V.
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- **Plant-animal interactions in random environments: Habitat-stage elasticity, seed predators, and hurricanes** *ECOLOGY*
Horvitz, C. C., Tuljapurkar, S., Pascarella, J. B.
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- Haridas, C. V., Tuljapurkar, S.
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 - **The many growth rates and elasticities of populations in random environments** *AMERICAN NATURALIST*
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 - **Reproductive effort in variable environments, or environmental variation is for the birds** *ECOLOGY*
Orzack, S. H., Tuljapurkar, S.
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 - **Escape in time: stay young or age gracefully?** *1st Alcala International Conference on Mathematical Ecology*
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 - **A universal pattern of mortality decline in the G7 countries** *NATURE*
Tuljapurkar, S., Li, N., Boe, C.
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 - **Validation, probability-weighted priors, and information in stochastic forecasts** *INTERNATIONAL JOURNAL OF FORECASTING*
Tuljapurkar, S., Boe, C.
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 - **Population momentum for gradual demographic transitions** *POPULATION STUDIES-A JOURNAL OF DEMOGRAPHY*
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 - **Uncertain demographic futures and social security finances** *110th Annual Meeting of the American-Economic-Association*
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 - **Demographic uncertainty and the stable equivalent population** *MATHEMATICAL AND COMPUTER MODELLING*
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- **Stochastic population forecasts for the United States: beyond high, medium, and low.** *Journal of the American Statistical Association*
Lee, R. D., Tuljapurkar, S.
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- **STOCHASTIC POPULATION FORECASTS AND THEIR USES** *INTERNATIONAL JOURNAL OF FORECASTING*
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- **DISEASE IN CHANGING POPULATIONS - GROWTH AND DISEQUILIBRIUM** *THEORETICAL POPULATION BIOLOGY*

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