

Curriculum Vitae

Hal Caswell

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Professor of Mathematical Demography
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Institute for Biodiversity and Ecosystem
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Born 27 April 1949

B.S. (with high honor), Michigan State University, 1971 (Zoology)
Ph.D., Michigan State University, 1974 (Zoology)

Professor of Mathematical Demography and Ecology, 2013-present, University of
Amsterdam
Emeritus Research Scholar, 2014 - present, Woods Hole Oceanographic Institution
Senior Scientist, March 1988-2014, Woods Hole Oceanographic Institution
Associate Scientist, 1981-1988, Woods Hole Oceanographic Institution
Assistant to Associate Professor, 1975-1982, University of Connecticut
Research Associate, 1974-1975, Michigan State University

Honors and Awards

Advanced Grants from the European Research Council:

The formal demography of kinship and families (FORMKIN): 2018-2024

Individual stochasticity and population heterogeneity in plant and animal demography
(INDSTOCH): 2013-2018

2023. Nominated as Population Expert by Population Europe.

2022. Three papers (1977, 1978a, and 1987b in this CV) were selected for inclusion in the
compilation, *Foundations of Ecology II: Classic Papers with Commentaries*, edited by
T.E. Miller and J. Travis, University of Chicago Press.

Editor's Choice award for paper 2021b as one of the best papers in volume 45 of the journal
Demographic Research, "in recognition of the rigorous formulation of a dynamic
algebraic model of kinship dynamics."

Editor's Choice award for the papers 2019g and 2020c in their respective volumes of the journal *Demographic Research*, for "pioneering contributions to the formal multistate demography of kinship."

Distinguished Lorentz Fellowship 2019-2020, Netherlands Institute for Advanced Study in the Humanities and Social Sciences.

Rollie Lamberson Medal of the Resource Modeling Association, 2019.

Mindel C. Sheps Award for Mathematical Demography, 2014, Population Association of America

Fellow of Ecological Society of America; Elected 2014 for "distinguished contributions to the discipline"

Vice President and President, Evolutionary Demography Society, 2013-2015.

Honorary Professor of Biodemography, Institute of Biology, Southern Denmark University. 2013-present.

Research Fellowship Award of the Alexander von Humboldt Foundation (Germany) 2011-2012.

Distinguished Brandt Memorial Lecturer, North Carolina State University, March 2009.

Distinguished Research Fellow, Max Planck Institute for Demographic Research, Rostock, Germany 2008 – present.

Recipient of the first Per Brink Oikos Award, presented by the Swedish Oikos Society in February 2008.

US Department of Interior Unit Citation Award for Excellence of Service, International Polar Bear Science Team, 2007.

Recipient of the 2007 Ecological Research Award from the Ecological Society of Japan.

ISI Highly Cited Researcher in Ecology/Environment, Thomson Scientific, 2007.

Certified Senior Ecologist, Ecological Society of America.

Fellow of the Ocean Life Institute, Woods Hole Oceanographic Institution, 2006-2009.

Maclaurin Fellowship, New Zealand Institute of Mathematics and its Applications, 2003.

Fellow of the American Academy of Arts and Sciences; Elected 2000.

Robert W. Morse Chair for Excellence in Oceanography, Woods Hole Oceanographic Institution, 2000 - 2005.

John Simon Guggenheim Memorial Fellowship, 1989-1990.

Fellow of the American Association for the Advancement of Science; Elected 1985,

Winner, 1992 Annual Prize for Best Scientific Paper in Biological Sciences, National Council for Scientific and Technological Investigation (CONICIT), Venezuela.

Vice-Chairman (1995-1996) and Chairman (1996-1997), Theoretical Ecology Section, Ecological Society of America.

Editor, *Advances in Ecological Research*, 2000 – 2007.

Board of Editors, *Ecology and Ecological Monographs*, 1987-1990.

Member: Ecological Society of America; Population Association of America, Evolutionary Demography Society, Dutch Society for Theoretical Biology (NVTB), Netherlands Demographic Society (NVD), Interdisciplinary Association for Population Health Science.

Visiting and Honorary Appointments

- Honorary Professor of Biodemography, University of Southern Denmark, Odense, Denmark.
May 2013 – present.
- Distinguished Research Fellow, Max Planck Institute for Demographic Research, Rostock,
Germany. January 2008 – present.
- Mclaurin Fellow, New Zealand Institute of Mathematics and its Applications, University of
Auckland, December 2003 – March 2004
- Visiting Fellow, Institute for Mathematics and its Applications, University of Minnesota, 1-
30 April 1999.
- Japan Society for Promotion of Science Invitational Fellowship for Research in Japan, June
1996.
- Visiting Fellow, Center for Applied Mathematics, Cornell University, June-July 1993
- Visiting Scientist, Laboratory of Theoretical Biology, Department of Biophysics, Kyoto
University, Japan. November 1992.
- Visiting Lecturer, Estacion Biologica de Donana, Sevilla, Spain, November 1991
- Lecturer, Third Autumn Course on Mathematical Ecology, Trieste, Italy, October 1990
- Visiting Professor, Dept. of Biology, Universidad de los Andes, Venezuela, September 1989
- Distinguished Visiting Professor, Dept. of Biology, University of Miami, February 1989
- Science Alliance Visiting Professor of Mathematics and Ecology, University of Tennessee,
January-April 1987
- Sloan Foundation Distinguished Lecturer in Demography, University of California, Berkeley,
March 1986
- Visiting Lecturer in Quantitative Ecology, W. K. Kellogg Biological Station, Michigan State
University, July 1985
- Research Associate, University of California, Berkeley, 1980-1981
- Visiting Faculty, OTS 80-3, Tropical Biology, Costa Rica, Summer 1980
- Visiting Professor, Washington State University (Pure and Applied Mathematics),
May 1978
- Visiting Lecturer, University of Texas (Zoology), January 1975

PUBLICATIONS

Papers submitted:

- a) Albrez-Gutierrez, Diego, Nicola Barban, **Hal Caswell**, Martin Kolk, Rachel Margolis, Emily Smith-Greenaway, Xi Song, et al. Kinship, demography, and inequality: Review and key areas for future development. (submitted)
- b) Zarulli, V. and **H. Caswell**. Longer healthy life, but for how many? Insights on healthy lifespan inequality from the Global Burden of Disease Study. (submitted)
- c) Feng, K., X. Song, and **H. Caswell**. The rising burden of dementia in Chinese families: Evidence from a kin-based dependency index. (submitted)

Papers in press:

- a) van Daalen, S. F. and **H. Caswell**. Demographic sources of variance in fitness. To appear in *Human Evolutionary Demography*, ed. Rebecca Sear, Oskar Burger, and Ronald Lee. Open Book Publishers (in press) <https://osf.io/p59eu/>
- b) Caswell, H., A.M. Verdery, and R. Margolis. The formal demography of kinship V: Loss of kin, bereavement, and cause of death. *Demographic Research* (in press)
- c) Alburez-Gutierrez, D., I. Williams, and H. Caswell. Projections of human kinship for all countries. *Proceedings of the National Academy of Sciences* (in press)

Preprints (reverse chronological order):

- a) Caswell, H., A.M. Verdery, and R. Margolis. 2023. The formal demography of kinship V: Loss of kin, bereavement, and cause of death. SocArXiv. <https://doi.org/10.31235/osf.io/mk64p>
- b) Gascoigne, S.J.L. et al. 2023. A standard protocol to report stage-structured demographic information. BioRxiv preprint. <https://doi.org/10.1101/2023.01.13.523871>;
- c) Alburez-Gutierrez, Diego, Nicola Barban, **Hal Caswell**, Martin Kolk, Rachel Margolis, Emily Smith-Greenaway, Xi Song, et al. 2022. “Kinship, Demography, and Inequality: Review and Key Areas for Future Development.” SocArXiv. June 18. <https://doi.org/10.31235/osf.io/fk7x9>
- d) Varas-Enriquez, P.J., S. van Daalen, and **H. Caswell**. 2022. Individual stochasticity in the life history strategies of animals and plants. bioRxiv preprint <https://doi.org/10.1101/2022.03.06.483187>
- e) **Caswell, H.** 2022. The formal demography of kinship IV: Two-sex models. bioRxiv preprint <https://doi.org/10.1101/2022.01.17.476606>
- f) Zarulli, V. and **H. Caswell**. 2022. Longer healthy life, but for how many? Insights on healthy lifespan inequality from the Global Burden of Disease Study. medRxiv preprint. <https://doi.org/10.1101/2022.12.06.22283153>
- g) **Caswell, H.** and S.F. van Daalen. 2021. Healthy longevity from incidence-based models: More kinds of health than stars in the sky. medRxiv preprint <https://doi.org/10.1101/2021.04.16.21255628>
- h) **Caswell, H.** and X. Song. 2021. The formal demography of kinship III: Kinship dynamics with time-varying demographic rates. bioRxiv preprint <https://doi.org/10.1101/2021.03.15.435377>
- i) **Caswell, H.** 2020. The formal demography of kinship II: Multistate models, parity, and sibship. bioRxiv preprint <https://doi.org/10.1101/2020.03.23.00384>
- j) Hernandez, C. M., S.F. van Daalen, **H. Caswell**, M.G. Neubert, and K.E. Gribble. 2019. Maternal effect senescence and fitness:^[1]A demographic analysis of a novel model organism. bioRxiv preprint <http://dx.doi.org/10.1101/847640>.
- k) Jenouvrier, S., L. Aubrey, S. F. van Daalen, C. Barbraud, H. Weimerskirch, and **H. Caswell**. 2019. When the going gets tough, the tough get going: effect of extreme climate on an Antarctic seabird's life history. bioRxiv preprint. <http://dx.doi.org/10.1101/791855>

Books:

2019. **Caswell, H.** *Sensitivity Analysis: Matrix Methods in Demography and Ecology*. Demographic Research Monographs. Springer Nature.
- 2005a. Keyfitz, N. and **H. Caswell**. *Applied Mathematical Demography*. Third edition. Springer-Verlag, New York, NY. 555pp.
- 2005f. **Caswell, H.** (ed.) *Food Webs: From Connectivity to Energetics*. Advances in Ecological Research 36. Elsevier Academic Press, San Diego, California. 194pp.
- 2001a. **Caswell, H.** *Matrix Population Models: Construction, Analysis, and Interpretation*. Second edition. Sinauer Associates, Sunderland MA. 722pp.
- 1997a. Tuljapurkar, S. and **H. Caswell** (eds.). *Structured Population Models in Marine, Terrestrial and Freshwater Systems*. Chapman and Hall, New York. 643pp.
- 1989a **Caswell, H.** *Matrix Population Models: Construction, Analysis, and Interpretation*. Sinauer Associates, Sunderland, MA. 328 pp.

All publications, reverse chronological order:

- 2023a. Gascoigne, S.J.L., S. Rolph, D. Sankey, N. Nidadavolu, A.S.S. Pičman, C. M. Hernández, M. E. R. Philpott, A. Salam, C. Bernard, E. Fenollosa, Y. J. Lee, J. McLean, S. H. A. Perera, O. G. Spacey, M. Kajin, A. C. Vinton, C. R. Archer, J. H. Burns, D. L. Buss, **H. Caswell**, J. P. Che-Castaldo, D. Z. Childs, P. Capdevila, A. Compagnoni, E. Crone, T. H. G. Ezard, D. Hodgson, T. M. Knight, O. R. Jones, E. Jongejans, J. McDonald, B. Tenhumberg, C. C. Thomas, A. J. Tyre, S. Ramula, I. Stott, R. L. Tremblay, P. Wilson, J. W. Vaupel, R. Salguero-Gómez. A standard protocol to report discrete stage-structured demographic information. *Methods in Ecology and Evolution*. 00:1-19.
DOI: 10.1111/2041-210X.14164
- 2023b. Jiang, S. , W. Zuo, Z. Guo, **H. Caswell**, and S. Tuljapurkar. How does the demographic transition affect kinship networks? *Demographic Research* 48:899-930.
- 2023c. **Caswell, H.** The contributions of stochastic demography and social inequality to lifespan variability. *Demographic Research* 49: 309-354.
DOI: 10.4054/DemRes.2023.49.13
- 2022a. van Daalen, S.F., C.M. Hernandez, **H. Caswell**, M.G. Neubert, and K.E. Gribble. The contribution of maternal age heterogeneity to variance in lifetime reproductive output. *American Naturalist* 199:603-616.
<http://doi.org/10.1086/718716>
- 2022b. Sun, R., C. Barbraud, H. Weimerskirch, K. DeLord, S.C. Patrick, **H. Caswell**, and S. Jenouvrier. Causes and consequences of pair-bond disruption in a sex-skewed population of a long-lived monogamous seabird. *Ecological Monographs* 2022 e1522.
<https://doi.org/10.1002/ecm.1522>

- 2022c. Song, X. and **H. Caswell**. The role of kinship in racial differences in exposure to unemployment. *Demography* 59:1325-1352.
<https://doi.org/10.1215/00703370-10057831>
- 2022d. Jenouvrier, S., L. Aubrey, S. F. van Daalen, C. Barbraud, H. Weimerskirch, and H. Caswell. 2022. When the going gets tough, the tough get going: effect of extreme climate on an Antarctic seabird's life history. *Ecology Letters* 25:2120- 2131.
<https://doi.org/10.1111/ele.14076>
- 2022e. Caswell, H. 2022. The formal demography of kinship IV: Two-sex models and their approximations. *Demographic Research* 47:359-396.
<https://doi.org/10.4054/DemRes.2022.47.13>
- 2022f. Ebeling, M., E. Acosta, **H. Caswell**, A.C. Meyer, and K. Modig. 2022, Years of life lost during the Covid-19 pandemic in Sweden considering variation in life expectancy by level of geriatric care. *European Journal of Epidemiology* 37(10): 1025-1034.
<https://doi.org/10.1007/s10654-022-00915-z>
- 2022g. Varas-Enriquez, P.J., S. van Daalen, and H. Caswell. 2022. Individual stochasticity in the life history strategies of animals and plants. *PLoS ONE* 17(9): e0273407.
<https://doi.org/10.1371/journal.pone.0273407>
- 2021a. **Caswell, H.** and S. F. van Daalen. Healthy longevity from incidence-based models: More kinds of health than stars in the sky. *Demographic Research* 45:397-452.
- 2021b. **Caswell, H.** and X. Song. The formal demography of kinship III. Kinship dynamics with time-varying demographic rates. *Demographic Research* 45:517-546.
- 2021c. Vindenes, Y., C. Le Couer, and **H. Caswell**. Introduction to matrix population models. In *Demographic Methods Across the Tree of Life*, ed. R. Salguero-Gomez and M. Gamelon. Oxford University Press, Oxford, UK.
- 2021d. Rémi Fay, Matthieu Authier, Sandra Hamel, Stéphanie Jenouvrier, Martijn van de Pol, Emmanuelle Cam, Jean-Michel Gaillard, ^[11]Nigel G. Yoccoz, Paul Acker, Andrew Allen, Lise M. Aubry, Christophe Bonenfant, **Hal Caswell**, Christophe F.D. Coste, Benjamin Larue, Christie Le Coeur, Marlène Gamelon, Kaitlin R. Macdonald, Maria Moiron, Alex Nicol-Harper, Fanie Pelletier, Jay J. Rotella, Celine Teplitsky, Laura Touzot, Caitlin P. Wells, Bernt-Erik Sæther. 2021. Quantifying fixed individual heterogeneity in demographic parameters: Performance of correlated random effects for Bernoulli variables. *Methods in Ecology and Evolution* 000:1-14.
- 2020a. van Daalen, S.F. and **H. Caswell**. Variance as a life history outcome: Sensitivity analysis of the contributions of stochasticity and heterogeneity. *Ecological Modelling* 417: 108856. <https://doi.org/10.1016/j.ecolmodel.2019.108856>
- 2020b. de Vries, C., R. A. Desharnais, and **H. Caswell**. A matrix model for density-dependent selection in stage-classified populations, with application to pesticide resistance in *Tribolium*. *Ecological Modelling* 416:108875
<https://doi.org/10.1016/j.ecolmodel.2019.108875>
- 2020c. **Caswell, H.** The formal demography of kinship II: Multistate models, parity, and sibship. *Demographic Research* 42: 1097-1144. DOI: 10.4054/DemRes.2020.42.38 [Editor's Choice award from *Demographic Research*]

- 2020d. Hernandez, C.M., S.F. van Daalen, **H. Caswell**, M.G. Neubert, and K.E. Gribble. A demographic and evolutionary analysis of maternal effect senescence. *Proceedings of the National Academy of Sciences USA*. 117 (28) 16431-16437. www.pnas.org/cgi/doi/10.1073/pnas.1919988117
- 2019a. Ackleh, A., **H. Caswell**, R. Chiquet, T. Tang, and A. Veprauskas. Sensitivity analysis of the recovery time for a population under the impact of an environmental disturbance. *Natural Resource Modeling* 32:e12166. doi: 10.1111/nrm.12166
- 2019b. de Vries, C. and **H. Caswell**. Stage-structured evolutionary demography: linking life histories, population genetics, and ecological dynamics. *American Naturalist* 193:545-559.
- 2019c. Reimer, J. R., **Caswell, H.**, Derocher, A. E., Lewis, M. A. Ringed seal demography in a changing climate. *Ecological Applications*. Online e01855
- 2019d. Seaman, R., T. Riffe, and **H. Caswell**. The changing contribution of area-level deprivation to total variance in age at death: A population-based decomposition analysis. *BMJ Open* 9:e024952
- 2019e. **Caswell, H.** *Sensitivity Analysis: Matrix Methods in Demography and Ecology*. Demographic Research Monographs. Springer Nature.
- 2019f. de Vries, C. and **H. Caswell**. Selection in two-sex stage-structured populations: genetics, demography, and polymorphism. *Theoretical Population Biology* 130:160-169. <https://doi.org/10.1016/j.tpb.2019.07.012>.
- 2019g. **Caswell, H.** The formal demography of kinship: A matrix formulation. *Demographic Research* 41:679-712. [Editor's Choice award from Demographic Research]
- 2019h. Jenouvrier S., Holland, M., Iles, D., Labrousse, S., Landrum, L., Garnier, J., **Caswell, H.**, Weimerskirch, H., LaRue, M., Ji, R., Barbraud, C. The Paris Agreement objectives will likely halt future declines of emperor penguins. *Global Change Biology* 00:1-15. DOI 10.1111/gcb.14864
- 2018a. Roth, G. and **H. Caswell**. Occupancy time in sets of states for demographic models. *Theoretical Population Biology* 120:62-77.
- 2018b. Needham, J., C. Merow, C-H. Chang-Yang, **H. Caswell**, and S. McMahon. A cross-scale demographic approach to forest dynamics. *Proceedings of the Royal Society B* (online) doi: 10.1098/rspb.2017.2050
- 2018c. Jenouvrier, S., L. Aubry, C. Barbraud, H. Weimerskirch, and **H. Caswell**. Interacting effects of unobserved heterogeneity and individual stochasticity in the life history of the southern fulmar. *Journal of Animal Ecology* 87:212-222. DOI: 10.1111/1365-2656.12752.
- 2018d. Shyu, E. and **H. Caswell**. Matings, births, and transitions: a new two-sex matrix model for evolutionary demography. *Population Ecology* 60:21-36.
- 2018e. Hartemink, N. and **H. Caswell**. Variance in animal longevity: contributions of heterogeneity and stochasticity. *Population Ecology* 60:89-99.
- 2018f. **Caswell, H.** and V. Zarulli. Matrix methods in health demography: a new approach to the stochastic analysis of healthy longevity and DALYs. *Population Health Metrics* 16:8 doi.org/10.1186/s12963-018-0165-5

- 2018g. **Caswell, H.** and Y. Vindenes. Demographic variance in heterogeneous populations: Matrix models and sensitivity analysis. *Oikos* 127:648-663.
- 2018h. Hamel, S., Gaillard, J-M, Yoccoz, N. G., Bassar, R., Bouwhuis, S, **Caswell, H.**, Douhard, M., Gangloff, E., Gimenez, O., Lee, P., Smallegange, I. M., Steiner, U., Vedder, O., and Vindenes, Y. Moving forward on individual heterogeneity. *Oikos* 127:750-756.
- 2018i. Jenouvrier, S. M. Desprez, R. Fay, C. Barbraud, H. Weimerskirch, K. Delord, and **H. Caswell**. Climate change and functional traits impact population dynamics of a long-lived seabird. *Journal of Animal Ecology* 87:906-920. DOI: 10.1111/1365-2656.12827
- 2018j. **Caswell, H.**, C. de Vries, N. Hartemink, G. Roth, and S. F. van Daalen. Age x stage-classified demography: a comprehensive approach. *Ecological Monographs* 88:560-584.
- 2018k. de Vries, C. and **H. Caswell**. Demography when history matters: construction and analysis of second-order matrix population models. *Theoretical Ecology* 11:129-140.
- 2017a. Hartemink, N., T.I. Missov, and **H. Caswell**. Stochasticity, heterogeneity, and variance in longevity in human populations. *Theoretical Population Biology* 114:107-117.
- 2017b. Oli, M., J. Loughry, **H. Caswell**, C. Perez-Heydrich, C. McDonough, and R. Truman. Dynamics of leprosy in Nine-Banded Armadillos: Net reproductive number and effects on host population dynamics. *Ecological Modelling* 350:100-108.
- 2017c. **Caswell, H.** and E. Shyu. Senescence, selection gradients, and mortality. pp. 56-82 in *The Evolution of Senescence in the Tree of Life*. R.P. Shefferson, O.R. Jones, and R. Salguero-Gomez (editors). Cambridge University Press, Cambridge, UK.
- 2017d. van Daalen, S. F. and **H. Caswell**. 2017. Lifetime reproductive output: individual stochasticity, variance, and sensitivity analysis. *Theoretical Ecology*. 10:355-374.
- 2017e. Ackleh, A., R.A. Chiquet, B. Ma, T. Tang, **H. Caswell**, and N. Sidorovskaia. Analysis of the impact of environmental disasters on sperm whales using stochastic modeling. *Ecotoxicology* 26:820-830.
- 2017f. Smallegange, I., **H. Caswell**, M.E.M. Toorians, and A.M. de Roos. Mechanistic description of population dynamics using dynamic energy budget theory incorporated into integral projection models. *Methods in Ecology and Evolution* 8:146-154.
- 2017g. Wensink, M. J., **H. Caswell**, and A. Baudisch. The rarity of survival to old age does not drive the evolution of senescence. *Evolutionary Biology* 44:5-10. DOI 10.1007/s11692-016-9385-4
- 2016a. Salguero-Gomez, R., 20 co-authors, **H. Caswell***, and J.W. Vaupel*. [*=joint senior authors]. COMADRE: A global database of animal demography. *Journal of Animal Ecology* 85:371-384.
- 2016b. Shyu, E. and **H. Caswell**. A demographic model for sex ratio evolution and the effects of sex-biased offspring costs. *Ecology and Evolution* 6:1470-1492. doi: 10.1002/ece3.1902

- 2016c. Shyu, E. and **H. Caswell**. Frequency-dependent two-sex models: a new approach to sex ratio evolution with multiple maternal conditions. *Ecology and Evolution* 6:6855-6879. doi: 10.1002/ece3.2202
- 2016d. Koons, D.N., D.T. Iles, M. Schaub, and **H. Caswell**. A life history perspective on the demographic drivers of structured population dynamics in changing environments. *Ecology Letters* 19:1023-1031.
- 2016e. Roth, G. and **H. Caswell**. Hyperstate matrix models: extending demographic state spaces to higher dimensions. *Methods in Ecology and Evolution* 7:1438-1450. doi: 10.1111/2041-210X.12622
- 2016f. **Caswell, H.** and S. van Daalen. A note on the vec operator applied to unbalanced block matrices. *Journal of Applied Mathematics (online)* Volume 2016, Article ID 4590817. doi 10.1155/2016/4590817
- 2015a. **Caswell, H.** and F. A. Kluge. Demography and the statistics of lifetime economic transfers under individual stochasticity. *Demographic Research* 32:563-588.
- 2015b. Salguero-Gomez, R., **H. Caswell**, and 33 co-authors. The COMPADRE Plant Matrix Database: an open online repository for plant demography. *Journal of Ecology* 103:202-218.
- 2015c. van Daalen, S. and **H. Caswell**. Lifetime reproduction and the second demographic transition: Stochasticity and individual variation. *Demographic Research* 33:561-588.
- 2015d. **Caswell, H.** and N. Sanchez Gassen. The sensitivity analysis of population projections. *Demographic Research* 33:801-840.
- 2014a. Jones, O., A. Scheuerlein, R. Salguero-Gomez, C.G. Camarda, R. Schaible, B. Casper, J.P. Dahlgren, J. Ehrlén, M.B. Garcia, E. Menges, P.F. Quintana-Ascencio, **H. Caswell**, A. Baudisch, and J. Vaupel. Diversity of aging across the tree of life. *Nature* 505:169-173. (published online 2013).
- 2014b. Engelman, M., **H. Caswell**, and E. M. Agree. Why do lifespan variability trends for the young and old diverge? A perturbation analysis. *Demographic Research* 48:1367-1396.
- 2014c. Shyu, E. and **H. Caswell**. Calculating second derivatives of population growth rates for ecology and evolution. *Methods in Ecology and Evolution* 5:473-482.
- 2014d. Jenouvrier, S., M. Holland, J. Stroeve, M. Serreze, C. Barbraud, H. Weimerskirch, and **H. Caswell**. Climate change and continent-wide declines of the emperor penguin. *Nature Climate Change* 4:715-718. doi:10.1038/nclimate2280.
- 2014e. **Caswell, H.** A matrix approach to the statistics of longevity in heterogeneous frailty models. *Demographic Research* 31:553-592. doi: 10.4054/DemRes.2014.31.19
- 2013a. **Caswell, H.** Sensitivity analysis of discrete Markov chains via matrix calculus. *Linear Algebra and its Applications* 438:1727-1745. doi:10.1016/j.laa.2011.07.046 (published online 2011).
- 2013b. **Caswell, H.** and R. Salguero-Gomez. Age, stage, and senescence in plants. *Journal of Ecology* 101:585-595. doi: 10.1111/1365-2745.12088
- 2013c. van Raalte, A. and **H. Caswell**. Perturbation analysis of indices of lifespan variability. *Demography* 50:1615--1640.

- 2013d. Shyu, E., E. Pardini, T. Knight, and **H. Caswell**. A seasonal, density-dependent model for the management of an invasive weed. *Ecological Applications* 23:1893-1905.
- 2012a. Jenouvrier, S., M. Holland, J. Ströve, C. Barbraud, H. Weimerskirch, M. Serreze, and **H. Caswell**. Effects of climate change on an emperor penguin population: analysis of coupled demographic and climate models. *Global Change Biology* 18:2756-2770. doi: 10.1111/j.1365-2486.2012.02744.x.
- 2012b. **Caswell, H.** and E. Shyu. Sensitivity analysis of periodic matrix population models. *Theoretical Population Biology*. 82:329-339.
- 2012c. **Caswell, H.** Matrix models and sensitivity analysis of populations classified by age and stage: a vec-permutation matrix approach. *Theoretical Ecology* 5:403-417. DOI 10.1007/s12080-011-0132-2 (published online 2011)
- 2012d. Strasser, C.A., M.G. Neubert, **H. Caswell**, and C.M. Hunter. Contributions of high and low quality patches to a metapopulation with stochastic disturbance. *Theoretical Ecology* 5:167-1791. doi 10.1007/s12080-010-0106-9 (published online 2010).
- 2011a. **Caswell, H.** Beyond R_0 : Demographic calculation of variability in lifetime reproductive output. *PLoS ONE* 6(6): e20809. doi:10.1371/journal.pone.0020809
- 2011b. **Caswell, H.** Perturbation analysis of continuous-time absorbing Markov chains. *Numerical Linear Algebra with Applications* 18:901-917. doi:10.1002/nla.791
- 2011c. Klepac, P. and **H. Caswell**. The stage-structured epidemic: a multi-state matrix population model approach. *Theoretical Ecology* 4:301-319 (published online 2010).
- 2011d. **Caswell, H.**, M.G. Neubert and C.M. Hunter. Demography and dispersal: invasion speeds and sensitivity analysis in periodic and stochastic environments. *Theoretical Ecology* 4:407-421. DOI 10.1007/s12080-010-0091-z (published online 2010).
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