

Erik Svensson

Population biology, micro- and macroevolution

BECC: Biodiversity and Ecosystem services in a Changing Climate

eSSENCE: The e-Science Collaboration

Biodiversity and Evolution

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Research

I am an evolutionary biologist, interested in the interface between ecology and evolutionary biology. My research programme has both theoretical and empirical components.

I explore problems such as how frequency-dependent processes maintains diversity, whether genetic polymorphisms or species in ecological communities. I also strive to understand how natural and sexual selection interact and affect population divergence, reproductive isolation and ultimately speciation and biodiversity. I am also interested in how phenotypic plasticity - including learning - can shape both population divergence and in population persistence and its role in evolutionary rescue vs. extinction by natural or sexual selection. We have also investigated how temperature affects natural and sexual selection and thereby local adaptation, biogeographic patterns and phenotypic evolution on micro- and macroevolutionary time scales.

Empirically, I focus on insects, particularly the order Odonata (dragonflies and damselflies) although I have also worked with other organisms, including birds (blue tits and ostriches), lizards and freshwater isopods.

In my research group, we combine classical population biological studies in nature with field and laboratory experiments, population and quantitative genetic approaches, measurements of selection, genomics, phenomics and phylogenetic comparative methods. Currently, we address various problems ranging from the role of hybridization in explaining the phylogenetic distribution of colour polymorphisms in damselflies, to how to understand the causes of "Lewontin's Paradox" in primates.

In recent years, we have increasingly adopted tools from Artificial Intelligence (AI), particularly Machine Learning (ML) and Computer Vision (CV) to quantify phenotypic variation and evolution.

Research group ("Svensson Lab")

Current PhD-students

Iain Moodie (co-advisor) Sofie Nilén (main advisor) Zachary Nolen (co-advisor)

Current postdocs

Guillaume Lavanchy Anna Penna Natalie Roberts Mikkel Skovrind

Alumni from my lab (many which I still collaborate with)

Moritz Luerig (former postdoc)

Masahito Tsuboi (former postdoc, Independent Researcher)

Stephen De Lisle (former postdoc, Junior Lecturer)

Lesley Lancaster (former postdoc, Professor)

Beatriz Willink (former PhD-student, Assistant Professor)

Anna Runemark (former PhD-student, Senior Lecturer)

Jessica Abbott (former PhD-student, Professor)

Kristina Karlsson Green (former PhD-student, Researcher)

Miguel Gomez-Llano (former postdoc, Junior Lecturer)

Viktor Nilsson-Örtman (former postdoc, Senior Lecturer)

Yuma Takahashi (former postdoc, Associate Professor)

Rachael Dudaniec (former postdoc, Senior Lecturer)

Fabrice Eroukhmanoff (former PhD-student)

Tom Gosden (former PhD-student)

Machteld Verzijden (former postdoc)

Natsu Katayama (former postdoc, Associate Professor)

Shawn Kuchta (former postdoc, Professor)

Katie Duryea (former postdoc, Associate Professor)

Benjamin Jarrett (former postdoc, Lecturer)

Employment

Professor

Population biology, micro- and macroevolution

Lund University

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2020 Oct 23 → present

Principal investigator

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2010 Jan 1 → present

Researcher

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Professor

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2024 Apr 8 → present

Research outputs

Meta-analysis reveals that phenotypic plasticity and divergent selection promote reproductive isolation during incipient speciation

Jarrett, B. J. M., Downing, P. A. & Svensson, E. I., 2025 May, In: *Nature Ecology and Evolution*. 9, 5, p. 833-844 12 p.

A century of theories of balancing selection

Ruzicka, F., Zwoinska, M. K., Goedert, D., Kokko, H., Richter, X.-Y. L., Moodie, I., Nilen, S., Olito, C., Svensson, E. I., Czuppon, P. & Connallon, T., 2025 Feb 14, *bioRxiv*.

Why Do Some Lineages Radiate While Others Do Not? Perspectives for Future Research on Adaptive Radiations

De-Kayne, R., Schley, R., Barth, J. M. I., Campillo, L. C., Chaparro-Pedraza, C., Joshi, J., Salzburger, W., Van Bocxlaer, B., Cotoras, D. D., Fruciano, C., Geneva, A. J., Gillespie, R., Heras, J., Koblmüller, S., Matthews, B., Onstein, R. E., Seehausen, O., Singh, P., Svensson, E. I. & Salazar-Valenzuela, D. & 5 others, Vanhove, M. P. M., Wogan, G. O. U., Yamaguchi, R., Yoder, A. D. & Cerca, J., 2025 Feb, In: *Cold Spring Harbor perspectives in biology*. 17, 2, a041448.

Opsin gene expression plasticity and spectral sensitivity in male damselflies could mediate female colour morph detection

Roberts, N., Svensson, E. & Lienard, M., 2025, In: *Proceedings of the Royal Society B: Biological Sciences*. 12 p., 20242511.

Meta-analytical evidence for frequency-dependent selection across the tree of life

Gómez-Llano, M., Bassar, R. D., Svensson, E. I., Tye, S. P. & Siepielski, A. M., 2024 Aug, In: *Ecology Letters*. 27, 8, 12 p., e14477.

Heritable variation in thermal profiles is associated with reproductive success in the world's largest bird

Svensson, E. I., Schou, M. F., Melgar, J., Waller, J., Engelbrecht, A., Brand, Z., Cloete, S. & Cornwallis, C. K., 2024 Apr 1, In: *Evolution letters*. 8, 2, p. 200-211 12 p.

Tropical Origin, Global Diversification, and Dispersal in the Pond Damselflies (Coenagrionoidea) Revealed by a New Molecular Phylogeny

Willink, B., Ware, J. L. & Svensson, E. I., 2024 Mar, In: *Systematic Biology*. 73, 2, p. 290-307 18 p.

A systematic map of studies testing the relationship between temperature and animal reproduction

Dougherty, L. R., Frost, F., Maenpaa, M. I., Rowe, M., Cole, B. J., Vasudeva, R., Pottier, P., Schultner, E., Macartney, E. L., Lindenbaum, I., Smith, J. L., Carazo, P., Graziano, M., Weaving, H., Canal Domenech, B., Berger, D., Meena, A., Bishop, T. R., Noble, D. W. A. & Simões, P. & 24 others, Baur, J., Breedveld, M. C., Svensson, E. I., Lancaster, L. T., Ellers, J., De Nardo, A. N., Santos, M. A., Ramm, S. A., Drobniak, S. M., Redana, M., Tuni, C., Pilakouta, N., Zizzari, Z. V., Iossa, G., Lüpold, S., Koppik, M., Early, R., Gasparini, C., Nakagawa, S., Lagisz, M., Bretman, A., Fricke, C., Snook, R. R. & Price, T. A. R., 2024 Jan, In: *Ecological Solutions and Evidence*. 5, 1, e12303.

The Paradox of Predictability Provides a Bridge Between Micro- and Macroevolution

Tsuboi, M., Sztepanacz, J., De Lisle, S., Voje, K. L., Grabowski, M., Hopkins, M. J., Porto, A., Balk, M., Pontarp, M., Rossoni, D., Hildesheim, L. S., Horta-Lacueva, Q.J.-B., Hohmann, N., Holstad, A., Lürig, M., Milocco, L., Nilén, S., Passarotto, A., Svensson, E. I. & Villegas, C. & 5 others, Winslott, E., Liow, L. H., Hunt, G., Love, A. C. & Houle, D., 2024, In: *Journal of evolutionary biology*. 37, 12, p. 1413-1432 20 p.

The genomics and evolution of inter-sexual mimicry and female-limited polymorphisms in damselflies

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Frequency-dependent community dynamics driven by sexual interactions

Yamamichi, M., Tsuji, K., Sakai, S. & Svensson, E. I., 2023 Oct, In: *Population Ecology*. 65, 4, p. 204-219 16 p.

Why high-condition males might be bad news for females and populations

Svensson, E. I., 2023 Mar 21, In: *Proceedings of the National Academy of Sciences of the United States of America*. 120, 12, e2301989120.

Out of the tropics: Macroevolutionary size trends in an old insect order are shaped by temperature and predators

Svensson, E. I., Gómez-Llano, M. & Waller, J. T., 2023 Mar, In: *Journal of Biogeography*. 50, 3, p. 489-502 14 p.

Ecology, Agents, and the Causes of Selection: A Reply to Shuker

Svensson, E. I., 2023, *Evolutionary Biology: Contemporary and Historical Reflections Upon Core Theory*. Springer Nature , p. 225-227 3 p. (Evolutionary Biology - New Perspectives on its Development; vol. 6).

The Structure of Evolutionary Theory: Beyond Neo-Darwinism, Neo-Lamarckism and Biased Historical Narratives About the Modern Synthesis

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Yes Indeed, Evolutionary Biologists Should Pay More Attention to History: A Commentary on Smocovitis

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The study of evolution is fracturing – and that may be a good thing

Svensson, E., 2022 Nov 9, *The Conversation*.

Multivariate selection and the making and breaking of mutational pleiotropy

Svensson, E. I., 2022 Oct 1, In: *Evolutionary Ecology*. 36, 5, p. 807-828 22 p.

Evolutionary trade-offs between heat and cold tolerance limit responses to fluctuating climates

Schou, M., Engelbrecht, A., Brand, Z., Svensson, E., Cloete, S. W. & Cornwallis, C., 2022, In: *Science Advances*. 8, 21

Latitudinal clines in sexual selection, sexual size dimorphism and sex-specific genetic dispersal during a poleward range expansion

Dudaniec, R. Y., Carey, A. R., Svensson, E. I., Hansson, B., Yong, C. J. & Lancaster, L. T., 2022, In: *Journal of Animal Ecology*. 91, 6, p. 1104-1118

Phenotypic plasticity is aligned with phenological adaptation on both micro- and macroevolutionary timescales

De Lisle, S. P., Mäenpää, M. I. & Svensson, E. I., 2022, In: *Ecology Letters*. 25, 4, p. 790-801

Wolbachia-driven selective sweep in a range expanding insect species

Deng, J., Assandri, G., Chauhan, P., Futahashi, R., Galimberti, A., Hansson, B., Lancaster, L. T., Takahashi, Y., Svensson, E. I. & Duplouy, A., 2021 Dec, In: *BMC Ecology and Evolution*. 21, 1, 181.

Genome assembly, sex-biased gene expression and dosage compensation in the damselfly *Ischnura elegans*

Chauhan, P., Swaegers, J., Sánchez-Guillén, R. A., Svensson, E. I., Wellenreuther, M. & Hansson, B., 2021 Jul 1, In: *Genomics*. 113, 4, p. 1828-1837 10 p.

Population biology and phenology of the colour polymorphic damselfly *Ischnura elegans* at its southern range limit in Cyprus

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Computer Vision, Machine Learning, and the Promise of Phenomics in Ecology and Evolutionary Biology
Lürig, M. D., Donoughe, S., Svensson, E. I., Porto, A. & Tsuboi, M., 2021 Apr 21, In: *Frontiers in Ecology and Evolution*. 9, 19 p., 642774.

Extreme temperatures compromise male and female fertility in a large desert bird
Schou, M., Bonato, M., Engelbrecht, A., Brand, Z., Svensson, E., Melgar, J., Muvhali, P. T., Cloete, S. W. & Cornwallis, C., 2021 Feb 2, In: *Nature Communications*. 12, 10 p., 666 (2021).

A molecular phylogeny of forktail damselflies (genus *Ischnura*) reveals a dynamic macroevolutionary history of female colour polymorphisms

Blow, R., Willink, B. & Svensson, E. I., 2021, In: *Molecular Phylogenetics and Evolution*. 160, 107134.

The search for sexually antagonistic genes: Practical insights from studies of local adaptation and statistical genomics
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Male-male competition causes parasite-mediated sexual selection for local adaptation

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Changes in gene expression during female reproductive development in a color polymorphic insect

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Selection on phenotypic plasticity favors thermal canalization

Svensson, E. I., Gomez-Llano, M. & Waller, J. T., 2020, In: *Proceedings of the National Academy of Sciences of the United States of America*. 117, 47, p. 29767-29774 8 p.

The odonate phenotypic database, a new open data resource for comparative studies of an old insect order

Waller, J. T., Willink, B., Tschol, M. & Svensson, E. I., 2019 Dec 12, In: *Scientific Data*. 6, 1, 316.

Sexual conflict and intrasexual polymorphism promote assortative mating and halt population differentiation

Iversen, L. L., Svensson, E. I., Christensen, S. T., Bergsten, J. & Sand-Jensen, K., 2019 Mar 20, In: *Royal Society of London. Proceedings B. Biological Sciences*. 286, 1899

"Vi klimatforskare stödjer Greta och skolungdomarna"

Ahlberg, E., Akselsson, R., Akselsson, C., Andresen, L. C., Ardö, J., Björk, R. G., Björnsson, L., Boyd, E., Brady, M. V., Brogaard, S., Brönmark, C., Carlsson, P., Carton, W., Chen, D., Coria, J., Döscher, R., Filipsson, H. L., Frank, G., Friberg, J. & Gaillard, M.-J. & 45 others, Gamfeldt, L., Gärdenäs, A., Hallquist, M., Hammarlund, D., Hansson, L.-A., Heuzé, C., Holst, J., Isaxon, C., Jansson, J., Johansson, M., Johansson, T. B., Kasimir, Å., Kjellström, T., Koglin, T., Krause, T., Kristensson, A., Kritzberg, E., Wadin, J., Laureshyn, A., Lundgren Kownacki, K., Löndahl, J., Martinsson, J., Miller, P., Nicholas, K., Nielsen, T., Nikoleris, A., Olsson, L., Pagels, J., Parmentier, F.-J., Persson, A., Pleijel, H., Prentice, H. C., Rengefors, K., Roldin, P., Slunge, D., Smith, H. G., Sporre, M., Svenssonsson, B., Svensson, E., Swietlicki, E., Uddling, J., Wallin, G., Ahlkrona, J., Anderson, K. & Andersson, A., 2019 Mar 15, *Dagens nyheter* (DN debatt).

Eco-evolutionary dynamics of sexual selection and sexual conflict

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How frequency-dependent selection affects population fitness, maladaptation and evolutionary rescue

Svensson, E. I. & Connallon, T., 2019, In: *Evolutionary Applications*. 12, 7, p. 1243-1258

Macroevolutionary origin and adaptive function of a polymorphic female signal involved in sexual conflict
Willink, B., Duryea, M. C. & Svensson, E. I., 2019, In: American Naturalist. 194, 5, p. 707-724 18 p.

The Role of Mutation Bias in Adaptive Evolution

Svensson, E. I. & Berger, D., 2019, In: Trends in Ecology and Evolution. 34, 5, p. 422-434 13 p.

Climatic factors and species range position predict sexually antagonistic selection across taxa

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Sex differences in local adaptation: what can we learn from reciprocal transplant experiments?

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Signatures of local adaptation along environmental gradients in a range-expanding damselfly (*Ischnura elegans*)

Dudaniec, R. Y., Yong, C. J., Lancaster, L. T., Svensson, E. I. & Hansson, B., 2018 Jun, In: Molecular Ecology. 27, 11, p. 2576-2593

On Reciprocal Causation in the Evolutionary Process

Svensson, E. I., 2018 Mar, In: Evolutionary Biology. 45, 1, p. 1-14

Response to Comment on "Precipitation drives global variation in natural selection"

Siepielski, A. M., Morrissey, M. B., Buoro, M., Carlson, S. M., Caruso, C. M., Clegg, S. M., Coulson, T., DiBattista, J., Gotanda, K. M., Francis, C. D., Hereford, J., Kingsolver, J. G., Augustine, K. E., Kruuk, L. E. B., Martin, R. A., Sheldon, B. C., Sletvold, N., Svensson, E. I., Wade, M. J. & MacColl, A. D. C., 2018 Jan 26, In: Science (New York, N.Y.). 359, 6374, 2 p., eaan5760.

Frequency Dependence and Ecological Drift Shape Coexistence of Species with Similar Niches

Svensson, E. I., Gómez-Llano, M. A., Torres, A. R. & Bensch, H. M., 2018, In: American Naturalist. 191, 6, p. 691-703

Sexual conflict and ecology: Species composition and male density interact to reduce male mating harassment and increase female survival

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On the standardization of fitness and traits in comparative studies of phenotypic selection

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Body size evolution in an old insect order: No evidence for Cope's Rule in spite of fitness benefits of large size

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Checklist of the dragonflies and damselflies from Guyana (Insecta: Odonata), with new records from the country

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Back to basics: Using colour polymorphisms to study evolutionary processes

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Precipitation drives global variation in natural selection

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Intra-and intersexual differences in parasite resistance and female fitness tolerance in a polymorphic insect
Willink Castro, B. & Svensson, E. I., 2017 Jan 25, In: *Proceedings of the Royal Society B: Biological Sciences*. 284, 1847, 20162407.

Human influences on evolution, and the ecological and societal consequences
Hendry, A. P., Gotanda, K. M. & Svensson, E. I., 2017 Jan 19, In: *Philosophical Transactions of the Royal Society B: Biological Sciences*. 372, 1712, 20160028.

Do group dynamics affect colour morph clines during a range shift?
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Linking intra- and interspecific assortative mating: Consequences for asymmetric sexual isolation
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The measurement of selection when detection is imperfect: How good are naïve methods?
Waller, J. & Svensson, E. I., 2016 May 1, In: *Methods in Ecology and Evolution*. 7, 5, p. 538-548 11 p.

Adaptive Landscapes
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Gene expression under thermal stress varies across a geographic range expansion front.
Lancaster, L. T., Dudaniec, R. Y., Chauhan, P., Wellenreuther, M., Svensson, E. & Hansson, B., 2016, In: *Molecular Ecology*. 25, 5, p. 1141-1156

Rapid changes in genetic architecture of behavioural syndromes following colonization of a novel environment.
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The role of genes and environment in the phenotypic expression of alternative mating tactics: a reply to Buzatto et al
Neff, B. D. & Svensson, E. I., 2014 May 19, In: *Philosophical Transactions of the Royal Society B: Biological Sciences*. 369, 1642, 2 p., 20140052.

De novo transcriptome of *Ischnura elegans* provides insights into sensory biology, colour and vision genes
Chauhan, P., Hansson, B., Kraaijeveld, K., de Knijff, P., Svensson, E. & Wellenreuther, M., 2014, In: *BMC Genomics*. 15, 808.

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Does relaxed predation drive phenotypic divergence among insular populations?

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Evolution of increased phenotypic diversity enhances population performance by reducing sexual harassment in damselflies.

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Predator-Mediated Natural Selection on the Wings of the Damselfly *Calopteryx splendens*: Differences in Selection among Trait Types

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Sexual Selection in Complex Environments

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The effects of experience on the development of sexual behaviour of males and females of the banded demoiselle (*Calopteryx splendens*).

Verzijden, M., Scobell, S. K. & Svensson, E., 2014, In: *Behavioural Processes*. 109, Online 2 September 2014, p. 180-189

The interplay between local ecology, divergent selection and genetic drift in population divergence of a sexually antagonistic female trait

Karlsson, K., Svensson, E., Bergsten, J., Härdling, R. & Hansson, B., 2014, In: *Evolution*. 68, 7, p. 1934-1946

Beyond hybridization: diversity of interactions with heterospecifics, direct fitness consequences and the effects on mate preferences.

Svensson, E., 2013, In: *Journal of evolutionary biology*. 26, 2, p. 270-273

Ecology and Sexual Selection: Evolution of Wing Pigmentation in Calopterygid Damselflies in Relation to Latitude, Sexual Dimorphism, and Speciation

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Fewer invited talks by women in evolutionary biology symposia

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2024 Apr 10

Liam Revell
Svensson, E. (Host)
2023 Mar 1 → 2023 Mar 31

Reproductive Divergence as a Driver of Speciation
Svensson, E. (Chair)
2023 Jan 31

Ny studie – därför kan en överhettad slända påverka ditt välbefinnande
Svensson, E. (Interviewee) & Rydén, D. (Lyricist)
2021 Jan 30

American Naturalist (Journal)
Svensson, E. (Editorial board member)
2021 → ...

High temperatures threaten the survival of insects
Svensson, E. (Interviewee)
2020 Nov 10

Bridging micro- and macroevolution in an old insect order
Svensson, E. (Lecturer)
2020 Oct 14

Därför går evolutionen snabbare
Svensson, E. (Interviewee)
2017 Jan 15

Evolution kan gå väldigt snabbt – när människan är inblandad
Svensson, E. (Interviewee)
2016 Dec 5

Prizes and Distinctions

The Swedish King's 50th anniversary foundation award
Svensson, E. (Recipient), 2003 Mar 15

Awards

Female phenotypic variation and intersexual mimicry as a bridge between micro- and macroevolution
Svensson, E. (PI)
Swedish Research Council: SEK4,360,000.00
2025/01/01 → 2029/12/31