

J. ARVID ÅGREN, PhD

Wenner-Gren Fellow

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RESEARCH & TEACHING INTERESTS

My research focuses on the biology of genomic conflicts and what they can tell us about the evolution of conflict and cooperation more generally. I develop population genetic theory and perform comparative analyses to ask how and why such conflicts occur and how they fit into models of social evolution. I also work on the foundations of the so-called gene's-eye view of evolution, also known as selfish gene theory. I am currently writing the first book-length treatment of its history and development for Oxford University Press (scheduled for publication in 2021).

POSITIONS

2018 – **Wenner-Gren Fellow**, Department of Organismic and Evolutionary Biology, Harvard University, Cambridge, MA, USA
Host: David A. Haig, George Putnam Professor of Biology

2015–18 **Postdoctoral Associate**, Department of Molecular Biology and Genetics, Cornell University, Ithaca, NY, USA
Faculty Advisor: Andrew G. Clark, Jacob Gould Schurman Professor of Population Genetics

EDUCATION

2015 **Ph.D. in Ecology and Evolutionary Biology**, University of Toronto, Canada
Thesis: Mating System Shifts and Transposable Element Evolution
Faculty Advisor: Stephen I. Wright, Professor and Canada Research Chair in Population Genomics

2010 **B.Sc. in Biological Sciences (Honours in Evolutionary Biology)**, University of Edinburgh, UK

PUBLICATIONS

Total number of citations = 781, h-index = 13 (Google Scholar Jan. 8, 2021)

‡Denotes equal contribution.

Books

1. **Ågren JA**. In press. *The Gene's-Eye View of Evolution*. Oxford University Press.

Papers

1. **Ågren JA**‡, Munasinghe M‡, and AG Clark. 2020. Mitochondrial-Y chromosome epistasis in *Drosophila melanogaster*. *Proceedings of the Royal Society Series B*. 287: 20200469
2. **Ågren JA**‡, Davies NG‡, and KR Foster. 2020. Reply to: Broad definitions of enforcement are unhelpful for understanding evolutionary mechanisms of cooperation. *Nature Ecology & Evolution*. 4: 323
3. **Ågren JA**‡, Davies NG‡, and KR Foster. 2019. Enforcement is central for the evolution of cooperation. *Nature Ecology & Evolution*. 3: 1018–1029
4. Rubenstein DR, **JA Ågren**, L Carbone, HE Hoekstra, NC Elde, KM Kapheim, L Keller, CS Moreau, AL Toth, S Yeaman, and HA Hofmann. 2019. Coevolution of genome architecture and social behavior. *Trends in Ecology and Evolution* 34: 844–855
5. **Ågren JA**‡, Munasinghe M‡, and AG Clark. 2019. Sexual conflict through Mother's Curse and Father's Curse. *Theoretical Population Biology* 129: 9–17
6. **Ågren JA** and AG Clark. 2018. Selfish genetic elements. *PLoS Genetics* 14: e1007700
7. **Ågren JA**. 2018. The Hamiltonian view of social evolution. *Studies in History and Philosophy of Biological and Biomedical Science* 68–69: 88–93
8. **Ågren JA** and GDD Hurst. 2017. Selfish Genes. In *Oxford Bibliographies in Evolutionary Biology* (K. Pfennig ed.). Oxford University Press: New York
9. **Ågren JA**‡, Williamson RJ‡, Campitelli BE, and J Wheeler. 2017. Greenbeards in yeast: An undergraduate laboratory exercise to teach the genetics of cooperation. *Journal of Biological Education* 51: 228–236
10. **Ågren JA**. 2016. Selfish genetic elements and the gene's-eye view of evolution. *Current Zoology* 62: 659–665
11. **Ågren JA**, Huang H, and SI Wright. 2016. Transposable element evolution in the allotetraploid *Capsella bursa-pastoris*. *American Journal of Botany* 103: 1197–1202
12. **Ågren JA**, S Greiner, MTJ Johnson, and SI Wright. 2015. No evidence that sex and transposable elements drive genome size variation in evening primroses. *Evolution* 69: 1053–1062
13. Douglas G, Gos G, Steige K, Salcedo A, Holm K, **Ågren JA**, Hazzouri K, Wang W, Platts AE, Josephs EB, Williamson RJ, Neuffer B, Lascoux M, Slotte T, and SI Wright. 2015. Hybrid origins and the earliest stages of diploidization in the highly successful recent polyploid *Capsella bursa-pastoris*. *Proceedings of the National Academy of Sciences USA* 112: 2806–2811

14. Hough J[‡], **Ågren JA**[‡], Barrett SCH, and SI Wright. 2014. Chromosomal distribution of cyto-nuclear genes in a dioecious plant with sex chromosomes. *Genome Biology and Evolution* 6: 2439–2443
15. **Ågren JA**, Wang W, Koenig D, Neuffer B, Weigel D, SI Wright. 2014. Mating system shifts and transposable element evolution in the plant genus *Capsella*. *BMC Genomics* 15: 602
16. **Ågren JA**. 2014. Evolutionary transitions in individuality: insights from transposable elements. *Trends in Ecology and Evolution* 29: 90–96
17. Slotte T, Hazzouri KM, **Ågren JA**, Koenig D, Maumus F, Guo Y, Steige K, Platts AE, Escobar JS, Newman LK, Wang W, Mandaková T, Vello E, Smith LM, Steffen J, Takuno S, Brandvain Y, Coop G, Andolfatto P, Hu TT, Blanchette M, Clark RM, Quesneville H, Nordborg M, Gaut BS, Lysak MA, Jenkins J, Grimwood J, Chapman J, Prochnick S, Shu S, Rokhsar D, Schmutz J, Weigel D, Wright SI. 2013. The *Capsella rubella* genome and the genomic consequences of rapid mating system evolution. *Nature Genetics* 45: 831–835
18. **Ågren JA**. 2013. Selfish genes and plant speciation. *Evolutionary Biology* 40: 439–449
19. Ross RI, **Ågren JA**, and JR Pannell. 2012. Exogenous selection shapes germination behaviour and seedling trait of populations at different altitudes in a *Senecio* hybrid zone. *Annals of Botany* 110: 1439–1447
20. **Ågren JA** and Wright SI. 2011. Co-evolution between transposable elements and their host: a major factor in genome size evolution? *Chromosome Research* 19: 777–786
21. Charlesworth D, Qiu S, Bergero R, **Ågren JA** and SI Wright. 2010. Using DNA sequence diversity to test for selection in *Silene*. *International Journal of Plant Science* 171: 1072–1082

Submitted

22. McCoy DE, **Ågren JA**, Kotler J, B Weir. Evolutionary conflict explains health problems during pregnancy

Perspectives, Commentaries, and Short Book Reviews

1. **Ågren JA**. 2020. Agents and Goals in Evolution by Samir Okasha. *The Quarterly Review of Biology*. 95: 266.
2. Elliott TE and **JA Ågren**. 2016. A naturalist's guide to mobile genetic elements. *Evolution: Education and Outreach*. 9: 1–3.
3. **Ågren JA**. 2016. The social life of the genome. *Trends in Ecology and Evolution*. 31: 494–495.
4. **Ågren JA** and SI Wright. 2015. Selfish genetic elements and plant genome size evolution. *Trends in Plant Science* 20: 195–196.
5. **Ågren JA**. 2015. Bortom det acceptablas gränser. Bengt Lidforss och lundaradikalismen [Beyond the limits of acceptability. Bengt Lidforss and the Lund radicalism]. *History and Philosophy of the Life Sciences* 37: 126–128.

6. **Ågren JA.** 2013. Plant Transposable Elements: Impact on Genome Structure and Function by M-A Grandbastien and J Casacuberta. *The Quarterly Review of Biology* 88: 252.
7. **Ågren JA.** 2013. Sex, spite, and selfish genes – Nature’s Oracle: The Life and Work of W. D. Hamilton. *Journal of Genetics* 92: 341–343.
8. Wright SI and **JA Ågren.** 2011. Sizing up *Arabidopsis* genome evolution. *Heredity* 107: 509–510.

Teaching Material

1. **Ågren JA,** Williamson RJ and J Wheeler. 2013. Greenbeards and the evolution of cooperation in yeast. In Wheeler, J. *BIO220: From genomes to ecosystem in a changing world. Laboratory Manual Winter 2013.* Department of Ecology and Evolutionary Biology, University of Toronto. (Re-published annually since.)
2. **Ågren JA,** Hay D, and L Swafe-Gonzales. 2011. *Biology Higher and Standard Level.* Lanterna Education International Baccalaureate Online Revision Courses.

Popular Science

1. **Ågren JA.** 2014. Are aggressive sperm a barrier to cross species sex? *Seeds of Science*
2. **Ågren JA.** 2013. A book that changed me: *The Selfish Gene.* *GuardianWitness*
3. **Ågren JA.** 2012. An ambitious take on human nature, a review of EO Wilson’s *The Social Conquest of Earth.* *Chirograph: Toronto Review of Books*
4. **Ågren JA.** 2012. Sci-lenced: A PEN Canada evening on scientists’ freedom of expression. *Chirograph, The Toronto Review of Books*
5. **Ågren JA.** 2011. Genomics helps us all. *The Varsity*
6. **Ågren JA.** 2011. Play Nice, a review of Martin Nowak and Roger Highfield’s *SuperCooperators.* *The Varsity*
7. **Ågren JA** and C White. 2011. What's in a name? *EUSci*
8. **Ågren JA.** 2010. Själviska gener. *Bi-lagan*
9. **Ågren JA.** 2010. Ännu ett kapitel i evolutionens historiebok. *evolutionsteori.se*

PRESENTATIONS

Invited Seminars

- 2020. Department of Biology, Brandeis University, USA
- 2019. Department of Biological Sciences, University of Tokyo, Japan
- 2019. Department of Ecology and Evolution, Stony Brook University, USA
- 2019. Theory Division, Lerner Research Institute, Cleveland Clinic, USA
- 2019. Department of Biology, Lund University, Sweden
- 2019. Museum of Comparative Zoology, Harvard University, USA

- 2018. Department of Biology, Syracuse University, USA
- 2018. Department of Biology, University of Kentucky, USA
- 2018. Gregor Mendel Institute, Vienna, Austria
- 2018. Petrov Group, Department of Biology, Stanford University, USA
- 2018. Department of Evolution and Ecology, University of California, Davis, USA
- 2017. Department of Biology, University of Rochester, USA
- 2017. Behaviour and Genetics of Social Insects Lab, University of Sydney, Australia
- 2017. New Directions in the Emergence and Maintenance of Individuality Conference, Sydney, Australia
- 2017. Social Evolution and Genome Complexity Symposium, Columbia University, USA
- 2016. Department of Biology, University of Maryland, USA
- 2015. Evolutionary Biology Centre, Uppsala University, Sweden
- 2015. Institute of Population Genetics, University of Veterinary Medicine, Vienna, Austria
- 2015. Magdalen College, Oxford, UK
- 2013. Department of Integrative Biology, University of Guelph, Canada
- 2013. Graduate Student Seminar Series, Institute of Integrative Biology, University of Liverpool, UK
- 2013. Foster Group, Department of Zoology, University of Oxford, UK

Conference Contributions

- 2019. Society for the Study of Evolution. Providence, RI, USA (talk)
- 2019. The Evolution of Cooperation and Conflict: From Theory to Experimental Evaluation, Uppsala, Sweden (talk)
- 2018. 2nd Joint Congress on Evolutionary Biology. Montpellier, France (talk)
- 2018. Society for Molecular Biology and Evolution. Yokohama, Japan (poster)
- 2018. American Society of Naturalists symposium on "150 Years Of *The American Naturalist*". Asilomar, CA, USA (talk)
- 2017. European Society for Evolutionary Biology. Groningen, Netherlands (talk)
- 2016. The Allied Genetics Conference. Orlando, FL, USA (poster)
- 2015. European Society for Evolutionary Biology. Lausanne, Switzerland (talk)
- 2014. National Academies Keck Futures Initiative (NAKFI) Conference on Collective Behavior: From Cells to Societies. Irvine, CA, USA (poster)
- 2014. Society for the Study of Evolution. Raleigh, NC, USA (talk)
- 2013. Society for Molecular Biology and Evolution. Chicago, IL, USA (talk)
- 2012. Population Genetics Group 46. Glasgow, UK (talk)
- 2012. 1st Joint Congress on Evolutionary Biology. Ottawa, Canada (talk)
- 2011. European Society for Evolutionary Biology. Tübingen, Germany (poster)

2011. Canadian Society for Ecology and Evolution, Banff, Canada (poster)

Popular Science

2019. Harvard Postdoc Science Café, Cambridge, USA

2015. iBiology Young Scientist Series, Online

2014. Treehouse Lecture Series, Toronto Public Library, Toronto, Canada

2013. Massey College Junior Fellow Lecture Series, Toronto, Canada

2012. Massey College WIDEN, Toronto, Canada

2012. Nerdnite, Toronto, Canada

2010. Massey College Junior Fellow Lecture Series, Toronto, Canada

2010. Workshops for Interdisciplinary Exchange and Novelty, Toronto, Canada

2009. Edinburgh University Science Magazine Seminar Series, Edinburgh, UK

TEACHING & ADVISING EXPERIENCE

Solo Instructor

Mendelian Outlaws: The Biology of Selfish Genetic Elements. Spring 2018. Cornell University, 7 students. I developed this freshman seminar course from scratch.

Guest Lecturer

Selfish Genetic Elements and Genomic Conflicts (Graduate students/postdocs), January 2020. Lecture + tutorial at the Interdisciplinary Study of Cooperation Winter School, Arizona State University, 20 students

Human Genomics (3rd/4th year undergraduate/1st year grad), Fall 2015, 2016, 2017, Cornell University, 30 students.

Teaching Assistant (University of Toronto)

Responsibilities included developing new class materials, leading class discussions, supervising labs, and grading assignments.

- *Evolutionary Medicine* (3rd year undergraduate), Spring 2015. 10 students
- *Adaptation and Biodiversity* (1st year undergraduate), Fall 2010–2014. 25 students
- *From Genomes to Ecosystems* (2nd year undergraduate), Spring 2012–2014, 25 students
- *Molecular and Cell Biology* (1st year undergraduate), Spring 2011, 25 students

Other

Biology and Mathematics. Easter and summer 2008–2010. Lanterna Education International Baccalaureate Revision Courses, London, UK and Stockholm, Sweden. 3-12 students.

Statistics. Summer 2010. Sweden Biology Olympics team, Swedish Centre for School Biology and Biotechnology, Uppsala, Sweden. 4 students.

Pedagogical Training

Advanced University Teaching Preparation Certificate, Centre for Teaching Support and Innovation, University of Toronto, 2012–2014.

Advising Experience

Two undergraduate students at the University of Toronto (2014) and one at Cornell University (2016-2017).

GRANTS, FELLOWSHIPS & AWARDS

Fellowships

- 2018 – 2021. Wenner-Gren Fellow, The Wenner-Gren Foundations
- 2017 – 2018. Postdoctoral Fellowship, The Sweden-America Foundation
- 2010 – 2015. Junior Fellow, Massey College, Toronto, Canada
- 2010 – 2015. University of Toronto Fellowship

Academic Recognitions

- 2017 + 2018. Finalist, Life Science Research Foundation postdoctoral competition
- 2015. Finalist, iBiology Young Scientist Series
- 2014. National Academy of Sciences Keck Futures Initiative Fellow
- 2013. Outstanding Teaching Assistant Award, Department of Ecology and Evolutionary Biology, University of Toronto
- 2013. The Alfred and Florence Aiken and Dorothy Woods Memorial Graduate Scholarship in Ecology and Evolutionary Biology
- 2013. Ramsay Wright Award, Department of Ecology and Evolutionary Biology, University of Toronto
- 2013. AAAS/ *Science* Program for Excellence in Science
- 2012. Best Student Talk (last day), PopGroup46, Glasgow, UK
- 2008. Gatsby Plants Scholar, The Gatsby Foundation Plant Science Summer School, UK
- 2007. Direct entry to second year, University of Edinburgh, UK

Travel Grants

- 2013 + 2018. Young Investigator Travel Award, Society for Molecular Biology and Evolution
- 2012. University of Toronto School of Graduate Studies Conference Grant
- 2011 – 2013 + 2015. Massey College Travel Grant
- 2011 + 2012. Massey College Scholarship
- 2008 + 2009. Grants from the Gatsby Plants Foundation, the Student Fund of the University of Edinburgh, the James Rennie Bequest, and the British Association for summer research at the University of Oxford and the University of Toronto.

WORKING GROUPS

- 2021 – *The Cooperation Science Network*. (Invited core faculty)
2017. *Social Evolution and Genome Complexity*. Columbia University and the National Science Foundation Sociogenomics Research Coordination Network. New York, NY, USA (Invited participant)
2014. *Evaluate the degree to which cooperation and conflict need to be balanced in order to facilitate the evolution, expansion, optimal performance, and maintenance of collective behaviors*. National Academies Keck Futures Initiative (NAKFI) Conference on Collective Behavior: From Cells to Societies. Irvine, CA, USA

PROFESSIONAL SERVICE

Reviewing

Journals

Acta Biotheoretica; American Naturalist; Current Zoology; eLife; Evolution; Evolution, Medicine, and Public Health; G3: Genes, Genomes, Genetics; Genome Biology and Evolution; Integrative and Comparative Biology; Journal of Evolutionary Biology; Journal of Molecular Evolution; Mobile DNA; Molecular Biology and Evolution; Nature Communications; Nature Human Biology; Nature Plants; New Phytologist; Peer J; Plant Science; PLoS Genetics; Philosophical Transactions of the Royal Society B; Philosophy of Science; Proceedings of the Royal Society B; Theoretical Population Biology; Trends in Ecology and Evolution;

Publishing Houses

Oxford University Press; World Scientific Publishing

Funding bodies

European Research Council (ERC); French National Research Agency (ARN); Czech Science Foundation (GAČR); Sigma Xi.

Symposia Organized

2018. Mode of Inheritance and Genomic Conflicts. 2nd Joint Congress on Evolutionary Biology. Montpellier, France. Co-organized with Hanna Johannesson, Uppsala University.
2015. Cooperation without Kinship: From Genomes to Mutualisms. 15th Congress of the European Society for Evolutionary Biology. Lausanne, Switzerland. Co-organized with Kevin Foster, University of Oxford.

Other Service

2020. Judge, National Collegiate Research Conference, Cambridge, MA, USA
2018. Poster judge, Cornell Undergrad Research Forum
2017. Skype a Scientist. Paired with a school in New Jersey, USA.

2016. Poster judge, The Allied Genetics Conference, Orlando, FL, USA
2014 – 2015. Member, Network of Experts, Evidence for Democracy, Canada
2010–2015. Co-President and several other peer elected positions in the Ecology and Evolution Graduate Student Association, University of Toronto, including Ombudsperson, Organizer of Graduate Student Seminar Series, Darwin Day, and Summer Book Clubs
2013. Brunch with Scientists, Cafe Scientifique, Toronto Science Festival
2013 – 2015. Student Representative, Academic Appeals Committee, Department of Ecology and Evolutionary Biology, University of Toronto
2012 – 2014. Judge, Toronto Science Fair
2010 – 2012. Tutor, Massey College High School Tutor and Mentorship Programme
2010 + 2013. Atwood Lecture Selection Committee, Department of Ecology and Evolutionary Biology, University of Toronto
2010 – 2012. President and Treasurer, Massey College Junior Fellow Lecture Series

PROFESSIONAL MEMBERSHIPS

Society for the Study of Evolution
European Society for Evolutionary Biology
Society for Molecular Biology and Evolution