

Pierre-André Eyer

POSTDOCTORAL RESEARCH ASSOCIATE IN EVOLUTIONARY BIOLOGY

French citizen, married, two children, 33 year old

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PROFESSIONAL APPOINTMENTS & EDUCATION

Feb. 2017-Now. Postdoctoral Research Associate (*Department of Entomology, Texas A&M University, College Station, Texas, U.S.A.*)

Comparative population genetics of invasive ant species

Advisor: Edward Vargo; Publications: P9, P10, P11, P12, P14, P15

Oct. 2016-Feb. 2017. Post doctorate fellow, ATER (*École Pratique des Hautes Études -EPHE-, Biologie Intégrative des Populations, Paris, France*)

Mating system and population structure of the desert ant *Cataglyphis cursor*

Advisor: Claudie Doums; Publication: P13

2014-2016. Post doctorate fellow (*Department of Zoology, The Georges S. Wise Faculty of Life Sciences, Tel Aviv University, Israel*)

Social structure and phylogeography of *Cataglyphis* desert ants

Advisor: Abraham Hefetz; Publications: P5, P6, P7, P8

2010-2014. Ph.D. thesis (*Evolutionary Biology and Ecology, Université Libre de Bruxelles, Belgium*)

Reproductive strategies and genetic diversity in *Cataglyphis* desert ants

Advisor: Serge Aron; Publications: P2, P3, P4

2010. Master thesis (*Evolutionary Biology and Ecology, Université Libre de Bruxelles, Belgium*)

Reproductive strategies of the ant *Cataglyphis velox*

Advisors: Serge Aron & Laurianne Leniaud; Publication: P1

2009. Master internship (*Evolutionary Biology and Ecology, Université Libre de Bruxelles, Belgium*)

Genetic diversity and relatedness in the common bat species *Pipistrellus pipistrellus*

Advisor: Serge Aron

2008-2010. Master degree in Ecology & Populations Biology (*University of Angers, France*)

2005-2008. Bachelor degree in Animal Biology (*University of Angers, France*)

PUBLICATIONS & PRESENTATIONS

Publications Accepted in Refereed Journals - #Supervised student

P15. Aguero CM[#], Eyer P-A, Crippen TL, Vargo EL (2021) Reduced environmental microbial diversity on the cuticle and in the galleries of a subterranean termite compared to surrounding soil. *Accepted in Microbial Ecology*

P14. Aguero CM[#], Eyer P-A, Vargo EL (2020) Increased genetic diversity from colony merging in termites does not improve survival against a fungal pathogen. *Scientific Reports*, 10, 4212.

P13. Khimoun A, Doums C, Molet M, Kaufmann B, Peronnet R, Eyer P-A, Mona S (2020) Urbanization without isolation: the absence of genetic structure among cities and forests in the tiny acorn ant *Temnothorax nylanderii*. *Biology Letters*, 16: 20190741.

P12. Eyer P-A, Espinoza EM, Blumenfeld AJ[#], Vargo EL (2020) The underdog invader: breeding system and colony genetic structure of the dark rover ant (*Brachymyrmex patagonicus* Mayr). *Ecology & Evolution*, 00: 1-13.

P11. Eyer P-A, Blumenfeld AJ[#], Vargo EL (2019) Sexually antagonistic selection promotes genetic divergence between males and females in an ant. *Proceedings of the National Academy of Sciences USA*, 201906568.

P10. Eyer P-A, McDowell B, Johnson LNL, Calcaterra LA, Fernandez, MB, Shoemaker DD, Puckett RT, Vargo EL (2018) Supercolonial structure of invasive populations of the tawny crazy ant *Nylanderia fulva* in the US. *BMC Evolutionary Biology*, 18, 209.

P9. Eyer P-A, Matsuura K, Vargo EL, Kobayashi K, Yashiro Y, Suehiro W, Himuro C, Yokoi T, Guénard B, Dunn RR, Tsuji K (2018) Inbreeding tolerance as a pre-adapted trait for invasion success in the invasive Needle ant *Brachyponera chinensis*. *Molecular Ecology*, 27, 4711-4724.

P8. Eyer P-A, Hefetz A (2018) Cytonuclear incongruences hamper species delimitation in the socially polymorphic desert ants of the *Cataglyphis albicans* group in Israel. *Journal of Evolutionary Biology*, 31, 1828-1842.

- P7. Saar M, **Eyer P-A**, Kilon-Kallner T, Hefetz A, Scharf I (2018) Within-colony genetic diversity differentially affects foraging, nest maintenance, and aggression in two species of harvester ants. *Scientific Reports*, 8, 13868.
- P6. **Eyer P-A**, Seltzer R, Reiner-Brodetzki T, Hefetz A (2017) An integrative approach to untangling species delimitation in the *Cataglyphis bicolor* desert ant complex in Israel. *Molecular Phylogenetic and Evolution*, 115, 128-139.
- P5. Iunesco A, **Eyer P-A** (2016) Notes on *Cataglyphis* Foerster, 1850 species belonging to the *bicolor* species-group in Israel; and a description of a new species. *Israeli Journal of Entomology*, 46, 109-131.
- P4. **Eyer P-A**, Leniaud L, Tinaut A, Aron S (2016) Combined hybridization and mitochondrial capture shape complex phylogeographic patterns in hybridogenetic *Cataglyphis* desert ants. *Molecular Phylogenetic and Evolution*, 105, 251-262.
- P3. Aron S, Darras D, **Eyer P-A**, Leniaud L, Percy P (2014) Colony genetic structure and breeding system in the ant *Cataglyphis viatica* (Fabricius, 1787). *Bull. Inst. Sci. Rab.*
- P2. **Eyer P-A**, Freyer J[#], Aron S (2013) Genetic polyethism in the polyandrous desert ant *Cataglyphis cursor*. *Behavioral Ecology* 24, 144-151.
- P1. **Eyer P-A**, Leniaud L, Darras H, Aron S (2013) Hybridogenesis through thelytokous parthenogenesis in two *Cataglyphis* desert ants. *Molecular Ecology* 22, 947-955.

Publications Submitted and Revised

- Blumenfeld AJ[#], **Eyer P-A (Co-first authors)**, Husseneder C, Mo J, Johnson LNL, Wang C, Grace JK, Chouvenec T, Vargo EL (*Accepted pending 'Cosmetic Revisions', in Communications Biology*) Bridgehead effect and multiple introductions shape the global invasion history of *Coptotermes formosanus*
- Eyer P-A**, Vargo EL (*Invited to Current Opinion in Insect Science, Accepted pending Minor Revisions*) The relationship between breeding structure and invasiveness in social insects.
- Aguero CM[#], **Eyer P-A**, Martin J, Bulmer MS, Vargo EL (*Accepted pending Minor Revisions in Ecology and Evolution*) Natural variation in a subterranean termite's individual immunity is not related to colony inbreeding.
- Eyer P-A**, Salin J[#], Helms A, Vargo EL (*Revised, Minor Revisions, to Scientific Reports*) Distinct chemical blends produced by different reproductive castes of the subterranean termite *Reticulitermes flavipes*.
- Eyer P-A**, Boursier T[#], Khimoun A, d'Ettorre P, Fédérici P, Finand B, Leroy C, Chifflet-belle P, Mona S, Monin T, Doums C (*Revised, Major Revisions, for Heredity*) Micro-allopatric differentiation challenges species delimitation in the *Cataglyphis cursor* thermophilic ant complex.
- Eyer P-A**, Vargo EL, Peeters CM (*Revised, Major Revisions, for Biological Journal of the Linnean Society*) One tree, many colonies: colony structure, breeding system and colonization events of host trees in tunneling *Melissotarsus* ants.
- Kjeldgaard MK, **Eyer P-A**, McMichael CC, Bockoven AA, King JT, Hyodo A, Boutton TW, Vargo EL, Eubanks MD (*Revised, Major Revisions, for Molecular Ecology*) Polygyne ants are not cooperating: Colony boundaries and larval discrimination in multiple-queen colonies of the red imported fire ant (*Solenopsis invicta*).
- Eyer P-A**, Blumenfeld AJ[#], Vargo EL (*Submitted to Molecular Ecology*) Approximate Bayesian Computations and ddRadSeq unravel the global invasion history of the termite species *Reticulitermes flavipes*.
- Eyer P-A**, Shults P, Chura MR, Moran MN, Thompson M, Helms A, Saran R, Vargo EL (*Submitted to Ecology & Evolution*) Divide and conquer: Multicolonial structure, nestmate recognition and antagonistic behaviors in dense populations of the invasive ant *Brachymyrmex patagonicus*.

Presentations Author presenting in bold

- Eyer P-A**, Blumenfeld A, Vargo E (2019) Sexually antagonistic selection: Genetic divergence between males and females maintains diversity in an ant. *Southeast Texas Evolutionary Genetics and Genomics Symposium, College Station, TX, USA.*
- Eyer P-A**, Vargo E (2018) Genetic differences between males and females in an ant highlight the reproductive system of the invasive Tawny Crazy ant *Nylanderia fulva*. *Entomological Society of America meeting, Vancouver, BC, Canada.*

- Eyer P-A**, Matsuura K, Vargo EL, Kobayashi K, Yashiro Y, Suehiro W, Himuro C, Yokoi T, Guénard B, Dunn RR, Tsuji K (2018-Poster) Inbreeding tolerance as a pre-adapted trait for invasion success in the invasive ant *Brachyponera chinensis*. *International Meeting of the IUSSI, Guaruja, Brazil*.
- Eyer P-A**, Matsuura K, Tsuji K, Vargo E (2017) Population genetics and colony breeding structure of the invasive ant *Brachyponera chinensis*. *Entomological Society of America meeting, Denver, CO, USA*.
- Eyer P-A**, Vargo E (2017) Impoverished genetic diversity and colony breeding structure in introduced populations of the invasive ant *Brachyponera chinensis*. *Ecology and Evolutionary Biology Lectures, College Station, TX, USA*.
- Eyer P-A**, Leniaud L, Aron S (2014) Social hybridogenesis shapes complex phylogeographic patterns in *Cataglyphis* desert ants. *International Meeting of the IUSSI, Cairns, Australia*.
- Eyer P-A**, Leniaud L, Darras H, Aron S (2013) Hybridogenesis in *Cataglyphis* clonal ants. *27th Colloque de l'UIEIS, Villetaneuse, France*.
- Eyer P-A**, Aron S (2012) Genetically mediated division of labor in the polyandrous desert ant *Cataglyphis cursor*. *19th Benelux Congress of Zoology, Brussels, Belgium*.
- Eyer P-A**, Leniaud L, Darras H, Aron S (2012-Poster) Hybridogenesis through thelytokous parthenogenesis in two *Cataglyphis* desert ants. *5th European Meeting of the IUSSI, Montecatini Terme, Italy*.
- Eyer P-A**, Freyer J, Aron S (2012) Genetic polyethism in the polyandrous desert ant *Cataglyphis cursor*. *5th European Meeting of the IUSSI, Montecatini Terme, Italy*.

Invited Presentations

- Eyer P-A** (2020) Social structure and mating strategies of different invasive ant species. *Entomology Department Seminar, College Station, TX, USA*.
- Eyer P-A**, Aron S. (2016) Social hybridogenesis: the unorthodox mating system of the *Cataglyphis* desert ants. *8th International Congress of Zoology, Bucharest, Romania*.

Co-authored Presentations

- Kjeldgaard MK**, Eyer P-A, McMichael CC, Bockoven AA, King JT, Hyodo A, Boutton TW, Vargo EL, Eubanks MD (2020) Polygyne ants are not cooperating: Colony boundaries and larval discrimination in multiple-queen colonies of the red imported fire ant. *Entomological Society of America meeting, Virtual meeting*.
- Saran RK**, Eyer P-A, Shults PT, Vargo E (2020) Impact of Maxforce® Quantum ant bait on rover ant (*Brachymyrmex spp.*) colonies in residential areas of Texas. *Entomological Society of America meeting, Virtual meeting*.
- Shults PT** Hopken M, Eyer P-A, Blumenfeld AJ, Cohnstaedt LW, Vargo E (2020) Incomplete lineage sorting, hybridization, and cryptic species in a North American *Culicoides* species complex. *Entomological Society of America meeting, Virtual meeting*.
- Aguero CM**, Eyer P-A, Vargo E (2019) Group diversity alters social immunity in the subterranean termite *Reticulitermes flavipes*. *Entomological Society of America meeting, St Louis, MI, USA*.
- Blumenfeld AJ**, Eyer P-A, Vargo EL (2019) Colony structure of the odorous house ant *Tapinoma sessile*, a native urban invader. *Entomological Society of America meeting, Southwestern Branch Meeting, Tulsa, OK, USA*
- Espinoza E**, Eyer P-A, Vargo E (2018) The population and colony genetic structure of the dark rover ant, *Brachymyrmex patagonicus* Mayr. *Entomological Society of America meeting, Vancouver, BC, Canada*.
- Eyer P-A, McDowell B, Johnson L, Calcaterra L, Shoemaker D, Puckett R, **Vargo E** (2017) Supercolonial structure in the invasive population of the tawny crazy ant *Nylanderia fulva*. *Entomological Society of America meeting, Denver, CO, USA*.
- Eyer P-A, Reiner T, **Hefetz A** (2016) Social polymorphism or cryptic speciation in the desert ant *Cataglyphis*. *6th European Meeting of the IUSSI, Helsinki, Finland*.
- Darras H**, Leniaud L, Eyer P-A, Aron S (2012) Social hybridogenesis in clonal ants of the *Cataglyphis altisquamis* group. *19th Benelux Congress of Zoology, Brussels, Belgium*.

GRANTS & AWARDS

2019 – Southeast Texas Evolutionary Genetics and Genomics Collaborative grant - 16,000\$
2015 – David Furth Fellowship for systematic Entomology – 2,000\$
2014 – The Georges S. Wise Science Post-Doctoral Fellowship, Dept. of Zoology

TEACHING

Practical exercises for Population Genetics (*Université Libre de Bruxelles, Belgium*; Bachelor degree).
Introduction to Population Genetics (*EPHE, Paris, France*; Master degree).
Lab instructor for Chemical Ecology (Texas A&M University, TX, USA; Graduate Students)

LABORATORY, ANALYTICAL & STATISTICAL SKILLS

Field sampling & rearing of ant and termite colonies
(Termite Course 2019, Ft Lauderdale, FL, USA).
Genetic analyses: DNA extraction & sequencing: microsatellite, mitochondrial & nuclear markers
Populations genetic structure & phylogeographic analyses (e.g., Parental offspring inferences; *F-statistics* estimation; Structure, isolation-by-distance & AMOVA analyses).
Phylogenetic analyses (Phylogenetic reconstruction & Species delimitation models).
Chemical analyses: Hydrocarbon extraction and peak integration
Statistical analyses with R software
Parasite preparation (i.e., *Metarhizium anisoplae* fungus culture & solution preparation) & ant infection.

INDUSTRY-SPONSORED RESEARCH

Colony elimination of the house pest ant *Brachymyrmex patagonicus* after chemical treatment
Colony replacement and elimination of the structural pest termite *Reticulitermes flavipes*

SERVICE

Reviewer: Peer-reviewed Journals

Article reviewer for *Biological Journal of the Linnean Society, Biological Invasion, Frontiers in Ecology & Evolution, Genes, Heredity, Insect Conservation and Diversity, Insect Systematics and Diversity, Insects, Insect Science, Insectes Sociaux, Journal of Economic Entomology, Molecular Ecology, Molecular Phylogenetics and Evolution, Myrmecological News, Zoological Journal of the Linnean Society*.

Reviewer: Grant Agencies

Project expertise for grant funding for *ECOS-Nord* comity (French Foundation).
Project expertise for grant funding for the Swiss National Science Foundation (SNSF).

Student Advising

Graduate Students

Master thesis (Freyer J, 2011-2012) Genetic polyethism in *Cataglyphis cursor* - (Publication: P2)
Master thesis (Guery P-A, 2013-2014) Pathogens resistance in *Cataglyphis* ants
Master thesis (Boursier T, 2016-2017) Population genetics of *Cataglyphis cursor* - (Publication in review)
PhD thesis (Aguero CM, 2018-2020) Pathogen resistance in termites - (Publications: P14 & 15)
PhD thesis (Blumenfeld AJ, 2017-2020) Invasive biology of social insects - (Publications: P11 & 12)

Undergraduate Students

Honored Student (Salin J, 2018-2019) Royal pheromone in termites (Publication in review)
Bachelor degree (Caulat L, Laymand E, 2016) Inbreeding & parthenogenesis in *C. cursor*
Bachelor degree (Avet M, 2013) Pathogens resistance in *Cataglyphis* ants

Institutional Service

Seminar organizer (2012-2014) for the *Evolutionary Ecology & Evolution* group in Brussels University.

Community Service & Outreach

Invited by the French Embassy in Romania for a 2hours class at high school (2016 – Anna de Noailles, School of Bucharest): '*Genetic as a tool to study Ecology and Evolution*'.
Accolade in Today's Sciences serving as support for school teaching. This includes a featured article, a Q&A with the scientist and a synopsis of his career development and achievements.

MEMBERSHIPS

Member of the International Union for the Study of Social Insects, French Section (UIEIS)
Member of the International Union for the Study of Social Insects, North American Section (IUSSI-NAS)
Member of the Entomological Society of America (ESA)