Dr. Antoine STIER

Department of Ecology and Physiology, University of Turku, Turku, Finland

https://antoinestier.wixsite.com/ageingecophysiology

Nationality: French - Age: 32

Scientific interests

My research is at the crossroad between physiology, ecology and gerontology. I am broadly interested in the physiological mechanisms contributing to the ageing process and their implication in shaping organism's phenotype from the conception to the death. My research focus on the contribution of mitochondrial function, oxidative stress, stress hormones and telomere dynamics as proximate mechanisms shaping health, ageing and life histories. I use mainly bird species as models, both in captivity and in their natural environment.

Educational background

2013	**PhD in Ecophysiology** with honours **- University of Strasbourg**
2008-2010	**MSc degree in Ecophysiology & Ethology** with honours **- University of Strasbourg**
2005-2008	**BSc degree in Cellular Biology and Physiology** with honours **- University of Strasbourg**

Scientific experiences

03/**2018**-03/**2021**	**TCSM Research Fellow (University of Turku, Finland) –** 'From mitochondrial function to Darwinian fitness: new insights from wild bird species'
02/**2016**-02/**2018**	**Marie Curie Research Fellow (University of Glasgow, UK) –** An avian model for understanding and preventing the negative effects of stressful developmental conditions on subsequent health state, fertility and ageing rate
09/**2014**-09/**2015**	**Research & Teaching assistant (University of Angers, France) –** Linking environmental constraints to stress physiology and ageing rate in ectotherms
03/**2014**-08/**2014**	**Research assistant (Universities of Strasbourg, Aberdeen and Glasgow) –** short-term contracts to conduct field and laboratory work on the physiological ecology of ageing
10/**2013**-03/**2014**	**Collaborator for the French Polar Institute (IPEV, France) –** Relationships between mitochondrial function, stress physiology and life history traits in the king penguin
2010-2013	**PhD in Ecophysiology (University of Strasbourg, France) -** "Oxidative stress, telomeres and mitochondrial uncoupling: key regulators of life history trade-offs?"
2010	**MSc internship (University of Strasbourg, France).** Phenotypic features and reproductive effort of leatherback turtles in French Guiana

Teaching & supervision of students

2019	**Supervision of Coline Marciau** (Pre-PhD funding, University of Turku)
2019	**Supervision of two MSc student projects** (University of Turku, Finland)
2017-2020	**PhD co-supervision of Tiia Kärkkäinen** (University of Turku)
2018	**Co-supervision of two BSc student projects** (University of Turku, Finland)
2017	**Guest lecture in Animal Physiology** (3rd BSc year, University of Glasgow, UK)
2016	**Supervision of two MSc and one BSc student projects** (University of Glasgow, UK)
2015	**Courses in Zoology, Ecology and Behavioural Ecology and** (100 contact hours: 1st BSc year, 2nd BSc year, 1st MSc year, University of Angers, France)
2015	**Supervision of two MSc student projects** (University of Angers, France)

2015	**Supervision of one PhD chapter** (Universities of Angers and Toulon, France)
2014	**Courses in Zoology and Applied Ecology** (90 contact hours: 1st BSc & MSc years, University of Angers)
2013	**Practical course of Ecology and Lecture in Biodiversity** (30 contact hours: 2nd BSc year, 2nd MSc year, University of Strasbourg, France)
2012	**Courses in Zoology and Behavioural Ecology** (60 contact hours: 1st BSc & MSc years, University of Strasbourg, France)
2012	**Supervision of three MSc student projects** (University of Strasbourg, France)
2011	**Courses in Behavioural Ecology** (40 contact hours: 1st and 2nd MSc years, University of Strasbourg)
2011	**Supervision of two MSc student projects** (University of Strasbourg, France)
2010	**Courses in Zoology and Ethology** (60 contact hours: 1st and 2nd BSc years, University of Strasbourg)

Other academic achievements

Organisation of conference:
Organiser of the *Evolutionary Ecology of Ageing* symposium at the *ESEB* meeting (Finland – 2019)
Organiser of the *Oxidative Stress* session at the *International conference on telomere dynamics* (UK - 2017)
President of the organising committee for the 9th *Ecology and Behaviour International Meeting* (France - 2013)

Invited seminars: University of Neuchâtel (Switzerland - 2016) & Monash University (Australia - 2017)

Organisation of weekly institute seminars: IBAHCM Glasgow (2016-17) – IPHC Strasbourg (2010-13)

Reviewing for international journals: 36 articles reviewed since 2013 (see https://publons.com/a/1216198)

Awards and Grants

2019	**Societas Pro Flora Fauna Fennica** (12.5 k€)
2018-21	**Turku Collegium for Science and Medicine (TCSM) Fellowship** (120 k€)
2018-21	**Australian Research Council Discovery Grant, Partner Investigator** (608 kAU$)
2017-20	**French Polar Institute Standard Grant, Partner Investigator** (438 k€)
2016-18	**Marie Curie Postdoctoral Individual Fellowship** (183 k€)
2014	**PhD award from the Biological Society of Strasbourg** (500€)
2010-13	**PhD grant from the French Minister of Research** (70 k€)

Main collaborations

French Polar Programs #119 & #131: *Determinants of individual quality in wild king penguins: from behaviour to the mitochondria (Dr. Jean-Patrice Robin, Dr. Vincent Viblanc & Dr. Damien Roussel)*

Dr. Paul Sunnucks (University of Monash, Australia): *Links between mitochondrial DNA polymorphism, mitochondrial function and fitness in the wild: the case-study of Eastern-Yellow Robins*

European COST Action CA15203 *MITOEAGLE*: *Mitochondrial mapping: Evolution – Age – Gender – Lifestyle – Environment. Participation in working group 4 "blood and cultured cells"*

Dr. Pierre Bize (University of Aberdeen, UK): *Mitochondrial role in shaping the life histories of birds*

Dr. Suvi Ruuskanen (University of Turku, Finland): *Prenatal thyroid hormones, mitochondrial function and telomeres*

Dr. Barbara Tschirren (University of Exeter, UK): *Pre-natal environment influence on mitochondrial function, oxidative stress and telomere length: an experimental approach using selection lines in Japanese quails*

Dr. Stefania Casagrande (Max Planck Institute, Germany): *Mitochondrial function in wild great tits*

Scientific publications

27 published articles, Google Scholar (15/10/2019): 805 citations, *h*-index = 15

1st or last authored papers (17):

17- **Stier A**, Bize P, Hsu B-Y & Ruuskanen S (2019). **Plastic but repeatable: rapid adjustments of mitochondrial function and density during reproduction in a wild bird species.** *bioRxiv 708867* (*accepted pending minor revision in Biology Letters*)

16- **Stier A,** Bize P, Haussmann M, Roussel D, Robin JP & Viblanc V (2019). **Oxidative stress and mitochondrial responses to stress exposure suggest that king penguins are naturally equipped to resist stress.** *Scientific Reports* **9**, 8545.

15- Reichert S & **Stier A** (2017). **Does oxidative stress shorten telomeres? A review**. *Biology Letters* **13** (34 citations)

14- **Stier A,** Romestaing C, Schull Q, Lefol E, Robin JP, Roussel D & Bize P (2017). **How to measure mitochondrial function in birds using red blood cells: a case study in the king penguin and perspectives in ecology and evolution.** *Methods in Ecology and Evolution* **8**, 1172-1182 (9 citations)

13- Marasco V*, **Stier A*** (joint 1st authors)**,** Boner W, Griffiths K, Heidinger B & Monaghan P (2017). **Environmental conditions can modulate the links among oxidative stress, age and longevity.** *Mechanisms of Ageing and Development* **164**, 100-107 (8 citations)

12- **Stier A***, Dupoué A* (joint 1st authors), Angelier F, Picard D, Brischoux F & Lourdais O (2017). **Oxidative stress in a capital breeder (*Vipera aspis*) facing pregnancy and water constraints.** *Journal of Experimental Biology* **220**, 1792-1796 (6 citations)

11- Simide R, Angelier F, Gaillard S & **Stier A** (2016). **Age and heat stress as determinants of telomere length in a long-lived fish, the Siberian sturgeon.** Physiological & Biochemical Zoology **89**, 441-447 (13 citations)

10- **Stier A**, Delestrade A, Pierre Bize, Zahn S, Criscuolo F & Massemin S (2016). **Investigating how telomere dynamics, growth and life-history covary along an elevation gradient in two passerine species.** *Journal of Avian Biology* **47,** 134-140 (14 citations)

9- **Stier A,** Reichert S, Criscuolo F & Bize P (2015). **Red blood cells open promising avenues for longitudinal studies of ageing in laboratory, non-model and wild animals.** *Experimental Gerontology* **71**, 118-134 (30 citations)

8- **Stier A**, Tissier M, Criscuolo F & Massemin S (2015). **Starting with a handicap: Effects of hatching asynchrony on growth rate, oxidative stress and telomere dynamics in free-living great tits.** *Oecologia* **179**, 999-1010 (27 citations)

7- **Stier A**, Bize P, Habold-Oudart C, Massemin S & Criscuolo F (2014) **Mitochondrial uncoupling prevents cold-induced oxidative stress: a case study using UCP1 knock-out mice.** *Journal of Experimental Biology* **217,** 624-630 (47 citations)

6- **Stier A**, Viblanc V, Massemin S, Handrich Y, Zahn S, Rojas E, Saraux C, Le Vaillant M, Prud'homme O, Grosbellet E, Robin JP, Bize P & Criscuolo F (2014). **Starting with a handicap: phenotypic differences between early- and late-born king penguin chicks and their survival correlates.** *Functional Ecology* **28**, 601-611 (33 citations)

5- **Stier A**, Delestrade A, Zahn S, Arrivé M, Criscuolo F & Massemin S (2014). **Elevation impacts the balance between growth and oxidative stress in coal tits.** *Oecologia* **175**, 791-800 (12 citations)

4- **Stier A,** Massemin S & Criscuolo F (2014). **Chronic mitochondrial uncoupling treatment prevents acute cold-induced oxidative stress in birds.** *Journal of Comparative Physiology B* **184**, 1021-1029 (18 citations)

3- **Stier A**, Bize P, Roussel D, Schull Q, Massemin S & Criscuolo F (2014). **Mitochondrial uncoupling as a regulator of life history trajectories in birds: An experimental study in the zebra finch.** *Journal of Experimental Biology* **217,** 3579-3589 (17 citations)

2- **Stier A**, Bize P, Schull Q, Zoll J, Singh F, Geny B, Gros F, Royer C, Massemin S & Criscuolo F (2013) **Avian erythrocytes have functional mitochondria, opening novel perspectives for birds as animal models in the study of ageing**. *Frontiers in Zoology* **10**, 33 (45 citations)

1- **Stier A**, Reichert S, Massemin S, Bize P & Criscuolo F (2012) **Constraint and cost of oxidative stress on reproduction - correlative evidence in laboratory mice and review of the literature.** *Frontiers in Zoology* **9**, 37 (86 citations)

Co-authored papers (12):

12- Gnaiger E, Aasander Frostner E, Abdul Karim N, Abumrad NA, ..., **Stier A**, ..., Zorzano A & Zvejniece L (2019). **Mitochondrial respiratory states and rates**. *MitoFit preprint Arch* doi:10.26124/mitofit:190001.v2

11- Kärkkäinen T, Teerikorpi P**,** Panda B, Helle S, **Stier A** & Laaskonen T (2019). **Impact of continuous predation threat on telomere dynamics in parent and nestling pied flycatchers.** *Oecologia* (in press)

10- Viblanc VA, Schull Q**,** Cornioley T, **Stier A**, Ménard JJ, Groscolas R & Robin JP (2018). **An integrative appraisal of the hormonal and metabolic changes induced by acute stress using king penguins as a model.** *General and Comparative Endocrinology* **269**, 1-10. (1 citation)

9- Viblanc VA, F. Dobson S, **Stier A**, Saraux C, Schull Q, Gineste B, Kauffmann M, Massemin S, Pardonnet S, Robin JP, Criscuolo F and Bize P (2016). **Mutually honest? Physiological 'qualities' signaled by color ornaments in a monomorphic seabird**. *Biological Journal of the Linnean Society* **118**, 200-214 (9 citations)

8- Schull Q, Dobson SF, **Stier A**, Criscuolo F, Lefol E, Saadaoui H, Robin JP, Bize P & Viblanc VA (2016). **Beak color dynamically signals changes in fasting status and parasite loads in king penguins (*Aptenodytes patagonicus*).** *Behavioral Ecology* **27**, 1684-1693 (10 citations)

7- Schull Q, Viblanc VA, **Stier A,** Saadaoui H, Lefol E, Criscuolo F Bize P & Robin JP (2016). **The oxidative debt of fasting: evidence for short to medium-term costs of advanced fasting in adult king penguins.** *Journal of Experimental Biology* **219**, 3284-3293 (13 citations)

6- Speakman J, Blount J, Bronikowski A, Buffenstein S, Isaksson C, Kirkwood T, Monaghan P, Ozanne S, Beaulieu M, Briga M, Carr S, Christensen L, Cochemé H, Cram D, Dantzer B, Harper J, Jurk D, King A, Noguera JC, Salin K, Sild E, Simons M, Smith S, **Stier A**, Tobler M, Vitikainen E, Peaker M & Selman C (2015). **Oxidative stress and life histories: unresolved issues and current needs.** *Ecology & Evolution* **5**, 5745-5757 (98 citations)

5- Reichert S, **Stier A**, Zahn S, Bize P, Massemin S & Criscuolo F (2014). **Increased brood size leads to persistent eroded telomeres**. *Frontiers in Ecology & Evolution* **2**, 9 (42 citations)

4- Viblanc VA, Gineste B**, Stier A**, Robin JP & Groscolas R (2014). **Stress hormones in relation to breeding status and territory location in colonial king penguin: a role for social density?** *Oecologia* **175**, 763-772 (18 citations)

3- Plumel M, **Stier A**, Thiersé D, Van Dorsselaer A, Criscuolo F & Bertile F (2014). **Litter size manipulation in laboratory mice: an example of how proteomic analysis can uncover new mechanisms underlying the cost of reproduction**. *Frontiers in Zoology* **11**, 41 (14 citations)

2- Lehto Hürlimann M, **Stier A**, Scholly O, Criscuolo F & Bize P (2014). **Short- and long-term effects of litter size manipulation in wild-derived common voles.** *Biology Letters* **10**, 20131096 (7 citations)

1- Geiger S, Le Vaillant M, Lebard T, Reichert S, **Stier A**, Le Maho Y, Criscuolo F (2012). **Catching-up but telomere loss: half-opening the black box of growth and ageing trade-off in wild king penguin chicks**. *Molecular Ecology* **21**, 1500-1510 (95 citations)

Presentations at national & international conferences

20) European Society for Evolutionary Biology (ESEB), August 2019 (Turku, Finland)

Oral presentation: Linking early-life environment to ageing rate: what role for prenatal thyroid hormones?

Poster: Prenatal programming of mitochondrial function: a potential mediator of transgenerational plasticity?

Poster: Age and environment (but not genetics) affect mitochondrial function in a wild bird species

***19)* Society for Experimental Biology Annual Conference, July 2018 (Florence, Italy) – Oral presentation**

Prenatal programing of mitochondrial function and oxidative stress by incubation temperature and stability in Japanese quails

***18)* SICB conference, January 2018 (San Francisco, USA) – Oral presentation**

Prenatal environment as a modulator of mitochondrial function: new insights from an avian model

***17)* CEPA conference, November 2017 (Strasbourg, France) – Oral presentation**

Embryo growth rate and stability influence telomere length: new insights from an avian model

***16)* International conference on telomere dynamics, October 2017 (Edinburgh, UK) – Oral presentation**

Telomere dynamics in Japanese quail: including interstitial telomeric sequences (ITS) leads to massive inter- but also intra-individual 'noise'

***15)* 11th European Ornithologists' Union Conference August 2017 (Turku, Finland) – Oral presentation**

Measuring mitochondrial function in birds using red blood cells: a case study in the king penguin and perspectives in ecology and evolution

***14)* International conference on telomere dynamics, November 2016 (Edinburgh, UK) – Oral presentation**

Early-life environmental conditions influence telomere dynamics during growth in birds

***13)* Society for Experimental Biology Annual Conference, July 2016 (Brighton, UK) – Oral presentation**

Red blood cells open promising avenues for longitudinal studies of ageing in captive and wild vertebrates

***12)* 9th International Conference of Comparative Physiology and Biochemistry, August 2015 (Krakow, Poland) – Invited oral presentation**

Thermogenesis, Fasting and Oxidative Stress: new insights from model and non-model animals

***11)* 1st Congress of Physiology and Integrative Biology, April 2015 (Strasbourg, France) – Poster**

How do adults and chicks of king penguin face nutritional constraints when breeding or growing

***10)* Rank Prize Fund symposium on oxidative stress, April 2014 (Grasmere, UK) – Invited oral presentation**

Producing heat but avoiding oxidative stress: the dilemma of thermogenesis in endotherms

***9)* 19th European Meeting of Evolutionary Biology, September 2013 (Exeter, UK) – Oral presentation**

Uncoupling to survive? Lessons from an experimental study in the zebra finch

***8)* 9th European Ornithologists' Union Conference August 2013 (Norwich, UK)**

Starting with a handicap: The impact of asynchronous hatching on growth and self-maintenance (oxidative stress and telomere dynamics) in great tit chicks

***7)* 11th International Ecology Congress, August 2013 (London, UK) – Poster**

Differential impact of elevation on life-history trajectories of great and coal tit chicks: Growth rate and telomere dynamics along an altitude gradient

***6)* Mito@Stras Meeting - December 2012 (Strasbourg, France) - Oral presentation**

Uncoupling Protein 1 and ageing: *New insight from the link between non-shivering thermogenesis and oxidative stress, and from a long-term survival analysis*

***5)* ED day Meeting - December 2012 (Strasbourg, France) – Oral presentation**

Mitochondria within non-mammalian erythrocytes: Presence, functionality & oxidative stress consequences

***4)* 6th Meeting "Réseau MeetOchondrie" - September 2012 (Soustons, France) - Poster**

Functional mitochondria in avian erythrocytes: Perspectives for ageing & evolutionary studies

3) **Evolutionary Biology Meeting - September 2012 (Marseilles, France) – Oral presentation**

Uncoupling to survive in the cold? New links between non-shivering thermogenesis and oxidative stress

2) **8th Meeting Ecology & Behaviour, April 2012 (Chizé, France) - Oral presentation**

Does altitude shape the trade-off between growth and ageing rate?

1) **EGI Evolution & Ecology Conference – January 2012 (Oxford, UK) - Oral presentation**

The growth and ageing trade-off: Oxidative stress as a cost for naturally higher growth rates