Christine Merlin

Curriculum vitae

Department of Biology
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Positions and Employment

2014-	Faculty of Neuroscience, Texas A&M University
2014-	Faculty of Genetics, Texas A&M University
2013-	Center for Biological Clocks Research, Texas A&M University, Member
2013-	Assistant Professor, Department of Biology, Texas A&M University
2007-2013	Postdoctoral Fellow with Dr. Steven Reppert, University of Massachusetts Medical School
2003-2006	Graduate research with Dr. Emmanuelle Jacquin-Joly and Dr. Martine Maibeche, National Institute of Agronomical Research and University Pierre and Marie Curie, France

Education

2003-2006	Ph.D., Insect Physiology, University Paris 6 Pierre and Marie Curie, France
2002-2003	M.S., Invertebrate Physiology, University Paris 6 Pierre and Marie Curie, France
1998-2002	B.S., Animal Biology, University Paris 6 Pierre and Marie Curie, France

Honors and Awards

2018	Junior Faculty Research Award, International Society for Research on Biological Rhythms
2017-2020	Klingenstein-Simons Fellowship Award in Neuroscience
2011-2013	Charles King Trust Postdoctoral Fellowship, The Medical Foundation
2009	Travel grant from the French Society of Chronobiology/European Biological Rhythms Society
2009	Hot topic symposium of the XI Congress of the European Biological Rhythms Society
2006	Student travel award from the Chemical Ecology Society
2003-2006	Ph.D. fellowship from the National Institute of Agronomical Research and Ile-de-France Region
2002-2003	Fellowship from the French Ministry of National Education

Professional activities

Memberships

2016-	Member of the Genetics Society of America
2014-	Member of the Society for Research on Biological Rhythms
2014-2019	Member of the NSF Insect Genetic Technology Network

Editorial activities

2013-	Review Editor, Frontiers in Ecology and Evolutionary Biology, Chemical Ecology
2009-2013	Associate member of Faculty of 1000 Biology

Reviewer activities

Grants

2018	National Science Foundation, Integrative Organismal Systems, *Ad hoc*
2017	National Science Foundation, Integrative Organismal Systems, *Ad hoc*
2015	National Science Foundation, Integrative Organismal Systems, *Ad hoc*
2015	National Science Foundation, Integrative Organismal Systems, Panelist

Manuscripts Animal Behavior, Behavior Genetics, Biological Journal of the Linnean Society, Cell Reports, European Journal of Neuroscience, Frontiers in Behavioral Neuroscience, Frontiers in Ecology and Evolutionary Biology, Gene Technology, Insect Molecular Biology, Journal of Biological Rhythms, Journal of Insect Science, Journal of the Lepidopterists' Society, Molecular Ecology, PloS One, Scientific Reports.

Awards

2018	International Society for Research on Biological rhythms meeting, Trainee Merit Awards

Conference organization

2018 Session Chair, Trainee Development Day, Society for Research on Biological Rhythms
2016 Co-organizer, Texas Society for Circadian Biology and Medicine meeting
2014 Session Chair, Society for Research on Biological Rhythms international meeting
2014 Workshop co-organizer, Trainee Development Day, Society for Research on Biological Rhythms

Consultant

2015 Book on Monarch butterflies in a series on Bioindicator animals (Red Line Amiral)

Invited Presentations/Seminars

2018 Journal of Experimental Biology 2018 Symposium, Linking brain and behavior in animal navigation (Cavo Olympo, Greece)
2017 8th Max Planck Institute-Chinese Academy of Sciences Exploratory Round Table Conference on "Mechanisms of Animal Behavior" (Shanghai, China)
2017 University of Missouri, Division of Biological Sciences, *Invited by Graduate Students*
2017 UC Davis, Department of Entomology and Nematology
2017 Texas Genetics Society meeting (College Station, TX)
2017 Genetics of Migration Symposium (Plön, Germany)
2017 Center for Circadian Biology Symposium, UC San Diego
2016 Texas A&M University, Department of Entomology, *Invited by Graduate Students*
2016 International Entomology Congress, Evolution of biological clocks Symposium (Orlando, FL)
2016 Virginia Tech University, Department of Biological Sciences
2016 Society for Research on Biological Rhythms (Tampa, FL)
2016 Texas A&M University, Department of Horticultural Sciences
2015 Texas A&M University, Interdisciplinary Program in Genetics
2015 Insect Genetic Technology Research Coordination Network, Special symposium on Flies, Monarchs, Mosquitoes: Insights using genetic technologies (Rockville, MD)
2015 Insect Genetic Technology Workshop, Annual Arthropod Genomics Consortium Symposium (Manhattan, KS)
2014 Baylor University, Department of Biology
2014 APS Intersociety Meeting: Comparative Approaches to Grand Challenges in Physiology (San Diego, CA)
2014 Texas A&M University, Zoology Society
2014 Southeastern and Central Texas Society for Clocks Meeting (Houston, TX)
2013 Texas A&M University, Genetic Graduate Student Association
2013 EFOR network, Genomics and Lepidoptera (Paris, France)
2013 Behavioural Ecology of Animal Movement, Post-congress Symposium of the 14th International Behavioral Ecology Congress (Lund, Sweden)
2010 Society for Research on Biological Rhythms (Sandestin, FL)

Peer-reviewed Publications

Peer-reviewed articles

16. Zhang Y, Markert MJ, Groves SC, Hardin PE and **Merlin C** (2017). Vertebrate-like CRYPTOCHROME 2 from monarch regulates circadian transcription via independent mechanisms on CLOCK and BMAL1. *Proc Natl Acad Sci USA* 114(36): E7516-E7525.

15. Markert MJ, Zhang Y, Enuameh MS, Reppert SM, Wolfe SA and **Merlin C** (2016). Genomic access to monarch migration using TALEN and CRISPR/Cas9-mediated targeted mutagenesis. *G3: Genes, Genomes, Genetics* 6:905-15.
• Featured in 2016 G3: Genes|Genomes|Genetics Spotlight.

14. **Merlin C***, Beaver LE, Taylor OR, Wolfe SA and Reppert SM* (2013) Efficient targeted mutagenesis in the monarch butterfly using Zinc Finger Nucleases. *Genome Research* 23:159-68. *: Co-corresponding authors.

13. Guerra PA, **Merlin C**, Gegear RJ and Reppert SM (2012) Discordant timing between antennae disrupts sun compass orientation in migratory monarch butterflies. *Nature Communications* 3:958.

12. Zhan S, **Merlin C**, Boore JL and Reppert SM (2011) The monarch butterfly genome yields insights into long-distance migration. *Cell* 147: 1171-1185.
11. Legeai F, Malpel S, Montagné N, Monsempes C, Cousseran F, **Merlin C**, François M-C, Maïbèche-Coisne M, Gavory F, Poulain J and Jacquin-Joly E (2011) An Expressed Sequence Tag collection from the male antennae of the Noctuid moth *Spodoptera littoralis*: a resource for olfactory and pheromone detection research. *BMC Genomics* 12: 86.
10. **Merlin C**, Gegear RJ and Reppert SM (2009) Antennal circadian clocks coordinate sun compass orientation in migratory monarch butterflies. *Science* 325: 1700-1704.
9. Bradley TJ, Briscoe AD, Brady SG, Cardinal S, Contreras HL, Danforth N, Dudley R, Grimaldi D, Harrison JF, Kaiser A, **Merlin C**, Reppert SM, Vanderbrooks JM and Yanoviak SP (2009) Episodes in Insect Evolution. *Integrative and Comparative Biology* 49: 590-606.
8. Malpel S, **Merlin C**, François M-C and Jacquin-Joly E (2008) Molecular identification and characterization of two new Lepidoptera chemoreceptors belonging to the *Drosophila* OR83b family. *Insect Molecular Biology* 17: 587-596.
7. **Merlin C**, Lucas P, Rochat D, François M-C, Maïbèche-Coisne M and Jacquin-Joly E (2007) An antennal circadian clock and circadian rhythms in the peripheral pheromone reception in the moth *Spodoptera littoralis*. *Journal of Biological Rhythms* 22: 502-514.
6. **Merlin C**, Rosell G, Carot-Sans G, François M-C, Bozzolan F, Pelletier J, Jacquin-Joly E, Guerrero A and Maïbèche-Coisne M (2007) Antennal esterase cDNAs from two pest moths, *Spodoptera littoralis* and *Sesamia nonagrioides*, potentially involved in odourant degradation. *Insect Molecular Biology* 16: 73-81.
5. De Santis F, François M-C, **Merlin C**, Pelletier J, Maïbèche-Coisne M, Conti E and Jacquin-Joly E (2006) Molecular cloning and *in situ* expression patterns of two new pheromone-binding proteins from the corn stemborer *Sesamia nonagrioides*. *Journal of Chemical Ecology* 32: 1703-1717.
4. **Merlin C**, François M-C, Queguiner I, Maïbèche-Coisne M and Jacquin-Joly E (2006) Evidence for a putative antennal clock in *Mamestra brassicae*: molecular cloning and characterization of two clock genes-*period* and *cryptochrome*- in antennae. *Insect Molecular Biology* 15: 137-145.
3. **Merlin C**, François M-C, Bozzolan F, Pelletier J, Jacquin-Joly E and Maïbèche-Coisne M (2005) A new aldehyde oxidase selectively expressed in chemosensory organs of insects. *Biochemical and Biophysical Research Communications* 332: 4-10.
2. Maïbèche-Coisne M, **Merlin C**, François M-C, Porcheron P and Jacquin-Joly E (2005) P450 and P450 reductase cDNAs from the moth *Mamestra brassicae*: cloning and expression patterns in male antennae. *Gene* 346: 195-203.
1. Maïbèche-Coisne M, **Merlin C**, François M-C, Queguiner I, Porcheron P and Jacquin-Joly E (2004) Putative odorant-degrading esterase cDNA from the moth *Mamestra brassicae*: cloning and expression patterns in male and female antennae. *Chemical Senses* 29: 381-390.

Reviews, book chapters

7. Denlinger DL, Hahn DA, **Merlin C**, Holzapfel CM, and Bradshaw WE. (2017) Keeping time without a spine: what can the insect clock teach us about seasonal adaptation? *Philosophical Transactions of the Royal Society B* 372:1734.
6. Reppert SM, Guerra PA and **Merlin C** (2016). Neurobiology of Monarch Butterfly Migration. *Annual Reviews of Entomology* 61:25-42.
5. **Merlin C**, Heinze S and Reppert SM. (2012) Unraveling navigational strategies in migratory insects. *Current Opinion in Neurobiol*ogy 22:353-61.
4. **Merlin C**, Gegear RJ and Reppert SM (2011) Monarch butterfly migration. In, McGraw-Hill Yearbook of Science and Technology, pp 212-214.
3. Reppert SM, Gegear RJ and **Merlin C** (2010) Navigational mechanisms of migrating monarch butterflies. *Trends in Neurosciences* 33: 399-406.
2. **Merlin C** and Reppert SM (2009) Lepidopteran circadian clocks: from molecules to behavior. In, Molecular Biology and Genetics of the Lepidoptera, Goldsmith M.R. and Marec, F.(Eds), Taylor & Francis, Boca Raton, FL, chap. 8, pp 137-152.
1. Jacquin-Joly E and **Merlin C** (2004) Insect olfactory receptors: contributions of molecular biology to chemical ecology. *Journal of Chemical Ecol*ogy 30: 2359-97.

Teaching

BIOL 609: Molecular Tools

Graduate course that focuses on modern tools and methods used in prokaryotic and eukaryotic molecular biology. Students learn to choose the appropriate experimental technique for a given scientific question and to design and interpret experiments. (Co-Intructor with Dr. Menet Jerome, Fall semester 2014, 2015, 2016, 2017)

BIOL 214: Genes, Ecology and Evolution

Undergraduate sophomore-level course that provides a genetically-based introduction to the study of ecology and evolution with an emphasis on the interactions of organisms with each other and with their environment. (Spring semester 2015, 2016, 2017, 2018)

Research Personnel

Current

Catherine Bogdan	Undergraduate research assistant *Recipient of: President's Endowed Scholarship, Billy G. Bethea '52 Scholarship, Joe and Billy Manion Endowed Scholarship*
Ashley Hayden	Undergraduate research assistant *Recipient of: 2018-2019 Astronaut Scholarship*
Samantha Iiams	Ph. D candidate *Recipient of: 2016 Texas A&M Genetics Outstanding Performance in Teaching Award, Best poster prize in the junior category at the 2017 Texas A&M Biology Student Postdoc Research Conference, Second place oral competition and People's Choice awards at the 2018 Texas A&M Genetics Symposium, Poster prize at the 2018 Texas Society for Circadian Biology and Medicine meeting, 2018 Society for Research on Biological Rhythms Patricia DeCoursey Excellence Award, 2018 Texas A&M Genetics Program Travel Award*
Aldrin Lugena	Ph. D candidate *Recipient of: 2018 Society for Research on Biological Rhythms Trainee Research Merit Award, 2018 Texas A&M Department of Biology Travel Award*
Anna Subonj	Undergraduate research assistant
Dr. Guijun Wan	Postdoctoral Researcher, Visiting Scholar
Dr. Ying Zhang	Postdoctoral Research Associate

Previous Visiting Scholars

Dr. Alok Arun	Assistant Professor, Institute of Sustainable Biotechnology, Inter American University of Puerto Rico

Previous Ph.D. Students (current position)

Matthew Markert, 2013-2015 (Research Associate, iBio inc.)

Previous Undergraduate Students

Jason Park (2017-18)	B.S. Biology TAMU
Kendall Bowen (2015-17)	B.S. Genetics TAMU, *Recipient of a poster prize at the 2017 TAMU Biology graduation reception (with Sarah Kenny)*
Melanie Goodman (2014-15)	B.S. Biology TAMU
Shayna Groves (2014-15)	B.S. Biology TAMU (Histology Technician at Amarillo Pathology Group, TX)
Sarah Kenny (2015-17)	B.S. Biology TAMU, *Recipient of a poster prize at the 2017 TAMU Biology graduation reception (with Kendall Bowen)*, (University of Texas School of Medicine at San Antonio)
Emily McKnight (2013-14)	B.S. Biology TAMU (Physician Assistant School, University of Texas Medical Branch, Galveston, TX)
Candice Medina (2015)	B.S. Biology TAMU, (Graduate School at Texas A&M University)
Lauren Nowlin (2016)	B.S. Biology TAMU
Justin Vann (2014)	B.S. Biology TAMU (M.S. student in Biomedical Sciences, Texas A&M University)

Funding

Current

NSF IOS 1456985 (PI: C. Merlin) 5/1/2015-4/30/2019
Title: Circadian clock control of seasonal migration (1-year no cost extension)
Total award amount: $550,863
The objectives of this project are to 1) genetically determine the role of the circadian clock in the control of the monarch butterfly migratory switch, and 2) to identify molecular pathways under clock-control in the monarch brain that underlie the photoperiodically-induced migratory switch.

Klingenstein-Simons Award in Neuroscience (PI: C. Merlin) 7/1/2017-6/30/2020
Title: Defining clock neuronal circuits that control seasonal behavior
Total award amount: $225,000
The objective of this project is to develop CRISPR/Cas9-assisted knock-in approaches in the monarch butterfly 1) to generate a reporter rhythmic monarch cell line, and 2) to tag clock neurons in vivo to map the circadian neural circuits in monarch brains and antennae and determine if they are rewired seasonally.

NIH R01 GM124617 (PI: C. Merlin, MPI: P. Hardin) 8/11/2017-8/10/2021
Title: Mechanisms of circadian repression
Total award amount: $1,157,576
The objective of this project is to determine 1) how PERIOD initiates on-DNA repression of CLOCK-BMAL1 and CLOCK-CYCLE transcription, and 2) how PERIOD and CLOCKWORKORANGE collaborate to maintain off-DNA transcriptional repression and promote CLOCK-CYCLE/CLOCK-BMAL1 transcription, using the monarch butterfly and *Drosophila* as two complementary models.

NSF IOS 1754725 (PI: C. Merlin) 6/1/2018-5/30/2021
Title: Epigenetic regulation of seasonal behavior in insects
Total amount requested: $600,000
The objective of this project is to delineate the epigenetic architecture that underlies differential gene expression in the monarch brain responsible for migratory behavior and the production of distinct seasonal flight orientations by identifying open chromatin regions, cis-regulatory elements and transcription factors that mediate differential gene expression between non-migrants, fall migrants and spring remigrants.

Completed

Center for Biological Clocks Research Bridge Funds Mini Grant (Co-PI with Dr. Paul Hardin) 2014
Title: Knocking out and tagging clock genes in *Drosophila* and the Monarch butterfly using CRISPR/Cas9 and TALEN-mediated genome editing approaches
Total amount: $16,000

University Services

Departmental

2015-2017	Faculty Search Committee, Department of Biology, Member (two consecutive searches)
2015	Student/Postdoc Research Conference Committee, Department of Biology, Chair
2014, 2016	Student/Postdoc Research Conference Committee, Department of Biology, Member

Graduate Committee member

2018-	Whitney Robertson, Department of Biology
2018-	James Kutlowski, Department of Biology
2018-	Jorden Holland, Genetics Program
2017-	Guosong Wang, Department of Animal Science
2017-	Amy Tan, Department of Biology
2016-	Justin Overcash, Genetics Program
2016-	Ashley Tessnow, Department of Entomology
2015-	Zachary Popkin-Hall, Department of Entomology
2015-	Andrew Sakla, Department of Biology
2015-	Joshua Beytebiere, Department of Biology
2014-	Michael Werry, Department of Biology

2016-2018 Miguel Gonzales, Genetics Program
2016-2018 Melanie DeSessa, Chemical Engineering Department
2015-2017 Courtney Caster, Genetics Program
2014-2017 Tianxin Liu, Department of Biology

Interdepartmental

2014-2016 Texas A&M Institute for Neuroscience, Graduate Program Committee, Member
2015-2016 Texas A&M Genetics Graduate program, Graduate Advising Committee, Member
2016- Texas A&M Genetics Graduate program, Graduate Recruiting Committee, Member