

Rajendhran Rajakumar

Department of Genetics
Blavatnik Institute
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Citizenship: CANADIAN

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PROFESSIONAL EXPERIENCE

CIHR Postdoctoral Fellow 2018-Current. Harvard Medical School, MA, USA
Dept. of Genetics
Advisor: Norbert Perrimon

Postdoctoral Fellow 2017-2018. Harvard Medical School, MA, USA
Dept. of Genetics
Advisor: Norbert Perrimon

Postdoctoral Researcher 2017. McGill University, QC, Canada. Department of Biology
Advisor: Ehab Abouheif

NSERC Postdoctoral Fellow 2014- 2017. University of Florida, FL, USA.
Dept. of Molecular Genetics and Microbiology
Advisor: Martin J. Cohn

EDUCATION

Ph.D. 2014. McGill University, QC, Canada. Department of Biology
Advisor: Ehab Abouheif

B.Sc. 2006. Concordia University, QC, Canada. Department of Biology

AWARDS, SCHOLARSHIPS & FELLOWSHIPS

2018 Postdoctoral Fellowship, Canadian Institutes of Health Research (CIHR)

2018 Konrad Lorenz Institute (KLI) Visiting Fellowship. Institute for the Advanced Study of Natural Complex Systems. Vienna, Austria

2015 Cameron Award, Canadian Society of Zoology, Best PhD Dissertation (awarded for the most outstanding thesis in Zoology submitted to a Canadian University)

2014- Postdoctoral Fellowship, Natural Sciences and Engineering Research

2016 Council of Canada (NSERC)

2014 Quebec Center for Biodiversity Science (QCBS) Excellence Award

2013 International Research Travel Award, Dept. of Biology, McGill University

2012 Étudiants-Chercheur Étoiles Laureate. Selected as one of the top PhD/Post-Doctoral researchers in the province of Québec for all of natural and applied sciences, Fonds de Recherche du Québec

2012 Dissertation Year Subsidy Award, Dept. of Biology, McGill University

2012 International Research Travel Award, Dept. of Biology, McGill University

- 2011** RNAi Course and Symposium entry competition, Pennsylvania State University (International competition, selected winners compensated for travel, accommodations, course registration and chosen to give a talk)
- 2009-2011** Post-Graduate Doctoral Scholarship, Fonds de recherche du Québec – Nature et Technologies (FQRNT)
- 2009** Winner of Symposium Host Competition, Canadian Society of Zoology (CSZ; CMD section), Toronto, Canada. Winner host's a symposium and awarded complete funding for all invited participants.
Title: *Gene regulation: An Eco-Evo-Devo perspective*

PUBLICATIONS (Published/In Press)

Journal Articles:

Sanger, T. and Rajakumar R. (2019). How a Growing Organismal Perspective is Adding New Depth to Integrative Studies of Morphological Evolution. ***Biological Reviews***, 94(1), 184-198.

Oettler J., Platschek T., Schmidt C., Rajakumar R., Favé MJ., Khila A., Heinze J., and Abouheif E. (2019). Evolution of a novel developmental switch underlies male wing polyphenism in *Cardiocondyla* ants. ***JEZ Part B: Molecular and Development Evolution***. 332(1-2), 7-16.

Rajakumar R., Koch S., Couture M., Fave MJ., Lillico-Ouachour A., Chen T., De Blasis G., Rajakumar A., Ouellette D., Abouheif E. (2018). Social regulation of a rudimentary organ generates complex worker caste systems in ants. ***Nature***, 562, 574–577. ****Highlighted by the Faculty1000 as 'Exceptional'*

Filowitz G*, Rajakumar R*, O'Shaugnessy KL*, Cohn MJ. (2018) Cartilaginous fishes provide insights into the origin, diversification and sexually dimorphic expression of vertebrate estrogen receptor genes. ***Molecular Biology and Evolution***, 35(11), 2695-2701. (*indicates co-first authorship)

Armisen D, Rajakumar R., Friedrich M, Benoit JB, Robertson HM, Panfilio KA...& Khila A. (2018) Genome of the water strider *Gerris buenoi* reveals expansions of gene repertoires associated with adaptations to life on the water. ***BMC Genomics***, 19:832

Yu J, Rong-Gang X, Xingjie R, Ewen-Campen B, Rajakumar R, Ruibao Z... & Jian-Quan N. (2018) Next generation CRISPR/Cas9 transcriptional activation in *Drosophila* using flySAM. ***Proceedings of the National Academy of Sciences***, 115(18), 4719-4724.

Béhague J., Fisher BL., Péronnet R, Rajakumar R., Abouheif E., Molet M. (2018) Ladder-like evolution of the gene regulatory network underlying wing polyphenism in ants. ***JEZ Part B: Molecular and Development Evolution***, 330(2), 109-117.

Alvarado, S.*, Rajakumar, R.*, Abouheif, E., and Szyf, M. (2015) Epigenetic variation in the *Egfr* gene generates quantitative variation in a complex trait in ants. ***Nature Communications***, 6. (*indicates co-first authorship)

Rajakumar R., San Mauro, D., Dijkstra, M., Wang, M., Wheeler DW., Hiou-Tim, F., Khila, A., Cournoyea, M., and Abouheif, E. (2012) Ancestral developmental potential facilitates parallel evolution in ants. **Science**, 335(6064), 79-82.

Suen, G., Teiling, C., Li, L., Holt, C., Abouheif, E., Bornberg-Bauer, E., ... & Currie, C. R. (2011). The genome sequence of the leaf-cutter ant *Atta cephalotes* reveals insights into its obligate symbiotic lifestyle. **PLoS genetics**, 7(2), e1002007.

Smith, C. D., Zimin, A., Holt, C., Abouheif, E., Benton, R., Cash, E., ... & Tsutsui, N. D. (2011). Draft genome of the globally widespread and invasive Argentine ant (*Linepithema humile*). **Proceedings of the National Academy of Sciences**, 108(14), 5673-5678.

Smith, C. R., Smith, C. D., Robertson, H. M., Helmkampf, M., Zimin, A., Yandell, M., ... & Gadau, J. (2011). Draft genome of the red harvester ant *Pogonomyrmex barbatus*. **Proceedings of the National Academy of Sciences**, 108(14), 5667-5672.

Book Chapters:

Abouheif, E., Favé, M.J., Ibarraran-Viniegra, A.S., Lesoway, M., Rafiqi, A.M., and Rajakumar, R. (2014). Eco-Evo-Devo: The Time Has Come. Landry, C., and Aubin-Horth, N., Eds. In **Ecological Genomics**. Springer

PUBLICATIONS (In Prep)

Rajakumar R., Tarazona OA, Filowitz G, Cohn MJ. (In Prep) Retention and Reactivation of ancestral developmental potential for bone formation in a cartilaginous fish.

TALKS AND POSTERS

2019 Invited Talk: OEB Dept., Harvard University, USA

2019 Invited Talk: Dept. of Biology, Boston College, USA

2019 Invited Talk: LTRI, Mt. Sinai Hospital, Univ. of Toronto, Canada

2018 Invited Talk: Allen Discovery Center, Tufts University, USA

2018 Invited Talk: Conference, Canadian Society of Zoology (CSZ), St. John's, NL, Canada.

2018 Invited Talk: Dept. Biology, Univ. of New Hampshire, USA

2017 Invited Talk: Dept. Biology, Univ. of Florida, USA

2015 Keynote Talk: Entomological Society of America, Minneapolis, MIN, USA

2015 Invited Talk: Dept. Nematology and Entomology, Univ. of Florida, USA

2015 Invited Talk: International workshop on plasticity (MicroMORPH), Morgan Arboretum, Harvard University, Boston, MA, USA

2015 Cameron Award Keynote Lecture: Conference, Canadian Society of Zoology (CSZ), Calgary, AB, Canada

2014 Talk: Conference, European Society for Evolutionary Developmental Biology (EED), Vienna, Austria

2014 Talk: Conference, Canadian Society of Zoology (CSZ), Montreal, Canada

- 2013** Talk: Dept. Seminar, McGill University, Dept. of Biology, Montreal, Canada
2011 Talk: Conference, International Symposium on Functional Genomic Tools in Honey Bees, State College, PA, USA
2010 Talk: Dept. Seminar, McGill University, Dept. of Biology, Montreal, Canada
2009 Symposia Organizer (Gene Regulation: An Eco-Evo-Devo perspective) and Talk: Conference, Canadian Society of Zoology (CSZ), Toronto, ON, Canada
2007 Talk: Conference, Canadian Society of Zoology (CSZ), Montreal, Canada
2007 Poster: Conference, Cell, Molecular and Developmental Biology (CMDDB), St. Adele, QC, Canada
2006 Keynote Talk: Conference, International Union for the Study of Social Insects (IUSI), Washington DC, USA
2005 Poster: Conference, Developmental Basis of Evolutionary Change (DBEC), Chicago IL, USA

TEACHING EXPERIENCE

University of Florida:

Course Lecturer **ZOO3603C:** Evolutionary Developmental Biology (2016)
 ENY3005: Principles of Entomology (2016)

McGill University:

Course Lecturer **BIOL200:** Molecular Biology (2009-13)

T-PULSE Fellow **BIOL112:** Cell & Mol. Biology (2011-12)
 Education Consultant for course revision

Teaching Assistant **BIOL200 (Lecture):** Mol. Biology (2006-08; 2011-12)

Teaching Assistant **BIOL112 (Online & Lecture):** Cell & Mol. Biology (2012)

Teaching Assistant **BIOL112 (Lab):** Cell & Mol. Biology (2007-09)

Supervision and mentorship Independent studies projects in - **Abouheif lab:**
 Corey Spies, Robert Fusco, Benjamin Fung, Yi Ning Chen, Jerry Fan,
 Steven Silvestrin, Anna Kazanets, Benoit St. Hilaire, Sofia Lane
 (2009-2014); Sophie Koch, Travis Chen **(Grad students, 2017-2018)**
 Cohn lab: Grant Filowitz, Darius Ramkhalawan **(2015-2017)**

PROFESSIONAL MEMBERSHIPS

Society of Integrative and Comparative Biology, Society of Developmental Biology, American Association for the Advancement of Science, Canadian Society of Zoology, European Society of Evolutionary Developmental Biology, Pan-American Society for Evolutionary Developmental Biology, International Union for the Study of Social Insects, Entomological Society of America, F1000

WORKSHOPS

The Groundfloor of Cognition: From Microbes to Plants and Animals (37th Altenberg Workshop, KLI; June 14-17, 2018)

Phenotypic Plasticity: Evolution at the Intersection of Ecology, Genetics, and Development (NSF MicroMORPH; Harvard, May 1-3, 2015)
Introduction to Mammalian Cell Culture Techniques (UF, March 18-19, 2015)
Bee Functional Genomics: RNAi technology (Penn State Univ., Aug. 1-7, 2011)
Introduction to light Microscopy Course (McGill, December 7-9, 2010)
Learning to Teach: Methods in teaching workshop (McGill, November 14, 2009)
Metabolomics: a workshop (McGill, May 4, 2007)

REVIEWING

I have served as a reviewer for the following journals: Molecular Biology and Evolution, Molecular Ecology, Journal of Evolutionary Biology, Evolution & Development, Journal of Experimental Zoology B: Molecular & Developmental Evolution, BMC Evolutionary Biology, The Science of Nature (Naturwissenschaften), Epigenetics, Current Opinion in Insect Science, and the Journal of Visual Experiments (JoVE).

SERVICE & PUBLIC OUTREACH

Academic

eLife Community Ambassador
Faculty1000 Associate Member
Nature Ecology & Evolution Community contributor
McGill University Biology Graduate Student Association (BGSA) Executive Council
BGSA representative/organizer for McGill Dept. of Biology, Molecular Seminar Series
Seminar on Evo-Devo to precollege (CEGEP) students of Marianopolis College in Montreal
Seminars introducing undergraduate Biology students to the different aspects of graduate school and research in collaboration with the McGill Biology Student Union (MBSU) and BGSA

Television

Interviewed for **Discovery Channel Canada** (DailyPlanet) for documentary on supersoldier ants
Interviewed for **Télé Québec** (Code Chastenay) for documentary on supersoldier ants
Interviewed for **Global News** (Global National) for primetime national news for the discovery of ancestral developmental potentials in supersoldier ants

Radio

Interviewed for **RTÉ One** (National Radio of Ireland) about supersoldier ants
Interviewed for **Radio Canada International** (Canada) about Ancestral developmental potentials in supersoldier ants

Online

Interviewed as a selected Premiere speaker ambassador by the **Entomological Society of America** at their 2015 meeting: on ant epigenetics and supersoldiers

Interviewed for **Popular Mechanics** about supersoldier ants

Interviewed for **Headway** (McGill Research News) about supersoldier ants

Interviewed for **Smithsonian** about the significance of rudimentary organs in development and evolution