

Natalia de Souza Araujo

Phd, Post doctoral in Bioinformatics - Molecular Biology

PERSONAL INFORMATION

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Personal webpage: natevolution.com

Script repository: <https://github.com/nat2bee>

SUMMARY

Currently a postdoctoral in bioinformatics at University of Brussels. Main responsibilities include the development and implementation of pipelines for the analyses of transcriptomic and genomic data. Experience in molecular biology and analyses of big data including genomes, transcriptomes and epigenomes.

EXPERIENCE

April 2019 - current

Post-doctoral researcher in Bioinformatics

Université Libre de Bruxelles – Laboratory of Evolutionary Biology & Ecology

Development and execution of analysis pipelines for transcriptomic and genomic datasets from ants in the team of Dr. Serge Aron. Analyses performed include: transcriptome assembly, differential expression analyses, co-expression analyses, gene ontology enrichment, comparative genomics (new genes and family expansion).

August 2017 – March 2019

Post-doctoral researcher in Bioinformatics and Molecular Biology

Université de Liège – GIGA Unity of Animal Genomics

Development of a new analysis strategy to identify gene conversion events at high resolution in pedigrees complete genomes in the team of Dr. Michel Georges. Analyses performed include: genotyping and variant calling in full genomes and the generation of python scripts to identify non-mendelian haplotype transitions, Oxford nanopore long reads sequencing and analyses.

June 2006 – February 2007

Sales assistant

Hanna Instruments Brasil Importação e Exportação LTDA

Technical sales support for laboratory equipment. Customer service, quotes preparation and sales follow up.

SUPERVISING and MENTORING

August 2018 – current

PhD co-supervisor

Paulo Cseri Ricardo – University of São Paulo

Study: “Expression of genes related to parasitic behaviour in bees”

August 2015 – February 2018

Undergraduate research mentor

Larissa Logullo Piconi – University of São Paulo

Study: “Gene expression analyses in bee social behaviour candidate genes”

EDUCATION

August 2012 – July 2017

Ph.D. in Genetics and Evolutionary Biology

University of São Paulo – Laboratory of Genetics and Evolution of Bess

Thesis: “Expression of Genes Involved in Social Behaviour in Bees with Different Levels of Eusociality”. Bee sampling. Laboratory experience in DNA and RNA extraction, purification and PCR. Comparative analyses of transcriptomic and bisulfite sequence data, and genome assembly of Illumina short and Pacbio long reads from non-model bee species.

May 2014 – May 2015

Visiting Researcher – Ph.D. candidate

Queen Mary University of London – Laboratory of Ants, Evolution & Genomics

Training in programming, statistics and gene expression analyses.

February 2010 – August 2012

M.Sc. in Genetics and Evolutionary Biology

University of São Paulo – Laboratory of Evolutionary Studies in True Fruit Flies

Monography: Analyses of the *Anastrepha fraterculus* complex (Diptera: Tephritidae) in Brazil based on mitochondrial *cytochrome oxidase I* sequences. Laboratory experience in DNA extraction, amplification (PCR) and sequencing. Phylogenetic analyses of mitochondrial DNA barcoding sequences.

February 2006 – February 2010

Bachelor of Science – Major in Biology

Universidade Paulista

February 2004 – July 2005

Technician in Chemistry

Escola Técnica Estadual Getúlio Vargas

LANGUAGE and PROGRAMMING SKILLS

- Portuguese (native); English (fluent); French (intermediary); Spanish (intermediary)
- Python; R and Unix Environment (bash and server analyses)

SOFT SKILLS

- Scientific rigor
- Problem-solving skills
- Ability to communicate well in English, both orally and in writing
- excellent interpersonal & communication skills
- Ability to prioritize multiple activities and establish realistic schedules
- Collaborative

FUNDING

- [2019] Pacbio, SMRT Leiden – Travel stipends (750 EUR)
[2017] Society for the Study of Evolution – Travel stipends (1,800 USD)
[2013-2017] FAPESP – Regular Ph.D. Fellowship
[2014-2015] FAPESP – BEPE Ph.D. Fellowship Abroad
[2010-2012] CNPQ – Regular M.Sc. Fellowship
[2008-2010] CNPQ/ UNIP – PIBIC Fellowship for undergraduate students
[2006-2010] PROUNI – Scholarship for graduation costs

AWARDS

- [2016] ICE – 2nd Place for Best Student Poster. Session: Genetics and Evolutionary Entomology
[2016] 62^o International-Brazilian Congress of Genetics – Honourable Mention for Participation in the Francisco Mauro Salzano Graduate Student Award of Evolution
[2014] IUSSI – 3rd Place for Best Student Poster
[2011] 57^o International-Brazilian Congress of Genetics – Honourable Mention for Participation in the Graduate Student Oral Award of Animal Genetics
[2009] Instituto Biológico – Scientific Merit for Oral Presentation

PUBLICATIONS

• Peer-reviewed journals

1. **Araujo, N.S.** and Arias M.C. (2021) Gene expression and epigenetics reveal species-specific mechanisms acting upon common molecular pathways in the evolution of task division in bees. *Sci. Rep.* doi.org/10.1038/s41598-020-75432-8
2. Françoso, E.*; **Araujo, N.S.***; Ricardo, P.C.; Santos, P.K.F.; Zuntini, A.R.; Arias, M.C. [2020] Evolutionary perspectives on bee mtDNA from mito-OMICS analyses of a solitary species. *Apidologie*. DOI: 10.1007/s13592-020-00740-x
3. **Araujo, N.S.** and Arias, M.C. [2019] Mitochondrial genome characterization of *Melipona bicolor*: Insights from the control region and gene expression data. *Gene*. DOI: 10.1016/j.gene.2019.04.042
4. Santos, P.K.F.; **Araujo, N.S.**; Françoso, E.; Zuntini, A.R.; Arias, M.C. [2018] Diapause in a tropical oil-collecting bee: molecular basis unveiled by RNA-Seq. *BMC Genomics*. DOI: 10.1186/s12864-018-4694-x
5. **Araujo, N.S.**; Santos P.K.F.; Arias M.C. [2018] RNA-Seq reveals that mitochondrial genes and long non-coding RNAs may play important roles in the bivoltine generations of the non-social Neotropical bee *Tetrapedia diversipes*. *Apidologie*. DOI: 10.1007/s13592-017-0542-2.
6. **Araujo, N.S.**; Zuntini A.R.; Arias M.C. (2016) Getting useful information from RNA-Seq contaminants: A case of study in the oil-collecting bee *Tetrapedia diversipes* transcriptome. *OMICS: A Journal of Integrative Biology*. DOI: 10.1089/omi.2016.0054.
7. Arias, M.C. **et al.** (2016) Microsatellite records for volume 8, issue 1. *Conservation Genetics Resources*. DOI: 10.1007/s12686-016-0522-2.
8. **Araujo, N.S.** and Borges J.C.S. (2015) Rodlet cells changes in *Oreochromis niloticus* in response to organophosphate pesticide and their relevance as stress biomarker in teleost fishes. *International Journal of Aquatic Biology*. 3(6), 398-408.

• Peer-reviewed conference proceedings

1. **Araujo, N.S.**; Arias, M.C. Gene expression analyses of bivoltine behaviour in the solitary bee *Tetrapedia diversipes* and its implication in eusociality. In: *XI Encontro sobre Abelhas*, 2015, Ribeirão Preto. Anais do XI Encontro sobre Abelhas. Ribeirão Preto: Moringa Comunicação LTDA, 2015. p. 186.
2. **Araujo, N.S.**; Arias, M.C. Transcriptome assembly for non-model Apinae bees: reference or de novo approach? In: *17th Congress of the International Union for the Study of Social Insects (IUSSI)*, 2014, Cairns. 17th Congress of the International Union for the Study of Social Insects (IUSSI), 2014.
3. **Araujo, N.S.**; Silva, J.R.M.C.; Borges, J.C.S. Células bastonetes como biomarcadores para águas contaminadas por agrotóxicos organofosforados. In: *7^o Congresso de Iniciação Científica em Ciências Agrárias, Biológicas e Ambientais*, 2009, São Paulo. O BIOLÓGICO. São Paulo, 2009. v. 71. p. 47-47.

- **Monographies**

1. Araujo, N.S. (2017) Expression of genes involved in the social behaviour of bees with different levels of eusociality. Doctoral theses, University of São Paulo, São Paulo – Brazil. DOI: 10.11606/T.41.2017.tde-04102017-081728
2. Araujo, N.S. (2012) Analyses of the *Anastrepha fraterculus* complex (Diptera: Tephritidae) in Brazil based on mitochondrial cytochrome oxidase I sequences. MSc dissertation, University of São Paulo, São Paulo – Brazil. DOI: 10.11606/D.41.2012.tde-18122012-225903

INVITED SPEAKER TALKS

October 2018

University of Brussels

Gene expression analyses in the search for genetic mechanisms related to social behavior and other traits in bees. Invited by Dr Claire Detrain, *Unit of Social Ecology*

August 2018

International congress of IUSSI

Unveiling the expression dynamics of genes involved in bee sociality. *Symposium: From genes to societies*

PRESENTATIONS in SCIENTIFIC MEETINGS

- **Talks**

- Araujo, N.S. and Arias M.C. (2017) DNA methylation and the evolution of bee eusociality. *Evolution*
- Araujo, N.S.; Wurm Y.; Arias M.C. (2016) Worker Subcastes: What makes bees nurses? IUSSI-NAS Colloquium.
- Araujo, N.S. and Arias M.C. (2016) Evolution of GC Content in Genes Involved In Eusociality. Brazilian-International Congress of Genetics.
- Araujo, N.S. and Arias M.C. (2015) Gene expression analyses of bivoltine behavior in the solitary bee *Tetrapedia diversipes* and its implication in eusociality. *Evolution*
- Araujo, N. S.; Wurm, Y.; Arias, M. C. (2014) Highly Eusocial and Solitary Bees: what about their gene expression? NWIUSSI
- Araujo, N. S.; Perondini, A. L. P.; Selivon, D. (2012) Limitações do Uso de DNA mitocondrial em Estudos Filogenéticos de Moscas-das-frutas. Universidade Paulista
- Araujo, N. S. (2011) Sequenciamento da região COI do DNA mitocondrial no estudo de espécies crípticas do complexo *Anastrepha fraterculus* (Diptera: Tephritidae). Instituto Butantã
- Araujo, N. S.; Silva, J. R. M. C.; Borges, J. C. S. (2010) Células Bastonetes como Biomarcadores para Águas Contaminadas por Agrotóxicos Organofosforados. XII Encontro de Iniciação Científica da Vice Reitoria de Pós Graduação e Pesquisa UNIP/ PIBIC- CNPq
- Araujo, N. S.; Silva, J. R. M. C.; Borges, J. C. S. (2009) Células Bastonetes como Biomarcadores para Águas Contaminadas por Agrotóxicos Organofosforados. 7º Congresso de Iniciação Científica em Ciências Agrárias, Biológicas e Ambientais

- **Poster**

- Araujo N.S. and Arias, M.C. (2019) Mitochondrial Genome Characterization of *Melipona bicolor*, an endemic bee from the Brazilian Atlantic Rain Forest – SMRT Leiden
- Araujo, N. S.; Wurm, Y.; Arias, M. C. (2017) Divisão de trabalho em operárias: O que torna as abelhas nutrízes? IV Workshop sobre Insetos Sociais – IUSSI Brazilian Section Annual Meeting
- Araujo, N.S. and Arias M.C. (2016) Evolution of GC Content in Genes Involved In Eusociality. Brazilian-International Congress of Genetics.
- Araujo, N.S.; Zuntini A.R.; Arias M.C. (2016) Getting useful information from RNA-seq contaminants: A case of study in *Tetrapedia diversipes* transcriptome. International Congress of Entomology (ICE).
- Araujo, N. S.; Arias, M. C. (2015) Gene expression analyses of bivoltine behaviour in the solitary bee *Tetrapedia diversipes* and its implication in eusociality. XI Encontro sobre Abelhas
- Araujo, N. S.; Arias, M. C. (2014) Transcriptome assembly for non-model Apinae bees: reference or de novo approach? 17th Congress of the International Union for the Study of Social Insects (IUSSI)
- Santos, P. K. F.; Araujo, N. S.; Arias, M. C. (2014) Comparing de novo assembly programs using transcriptome data from a non-model organism: *Tetrapedia diversipes* (Hymenoptera: Apidae: Tetrapediini). Congresso Brasileiro de Genética
- Araujo, N. S.; Perondini, A. L. P.; Selivon, D. (2011) Analyses of the *Anastrepha fraterculus* complex (Diptera: Tephritidae) based on mitochondrial cytochrome oxidase I sequences. 57º Congresso Brasileiro de Genética