Bárbara Domingues Bitarello

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Education

Ph.D. in Biology (Genetics) **2016**
Department of Genetics and Evolutionary Biology, University of São Paulo, São Paulo, Brazil
Advisor: Diogo Meyer

M.Sc. in Biology (Genetics) **2011**
Department of Genetics and Evolutionary Biology, University of São Paulo, São Paulo, Brazil

B.Sc. in Biological Sciences **2007**
University of Campinas, Campinas, Brazil
Licentiate Degree in Biological Sciences: teaching training for Elementary school

Research Experience

Perelman School of Medicine, University of Pennsylvania 2018-Present
Postdoctoral Researcher, Department of Genetics
Advisor: Iain Mathieson
Main project: Loss of accuracy in polygenic risk score in admixed populations

Max Planck Institute for Evolutionary Anthropology 2016-2017
Postdoctoral Researcher, Department of Evolutionary Genetics
Advisor: Aida Andrés
Main project: Adaptive evolution in the human lineage

University of São Paulo 2011-2016
Graduate Researcher, Department of Genetics and Evolutionary Biology
Advisor: Diogo Meyer
Ph.D. thesis: "Balancing selection in the human genome: biological relevance and deleterious consequence", 2016
Visiting graduate, Planck Institute for Evolutionary Anthropology, 2013
Master's Thesis: "Natural Selection on HLA genes: a molecular investigation of the location and timing of selection events", 2011

University of Campinas, Campinas,Brazil 2015-2007
Research Assistant, Department of Genetics
Advisor: Ana Maria Lima de Azeredo-Espin
Main project: "Development of polymorphic microsatellite markers for the human botfly, Dermatobia hominis (Diptera: oestridae)"

Publications & Preprints

1. *Genome-wide analysis identifies genetic effects on reproductive success and ongoing natural selection at the FADS locus.*
   Mathieson, I; Day, FR; Barban, N; Tropf, FC; Brazel, DM; eQTLGen Consortium; BIOS Consortium; Vaez, A; Zuydam, N; **Bitarello, BD**; Snieder, H; Hoed, M; Ong, KK; Mills, MC; Perry, JR
   bioRxiv, 2020

2. *Polygenic scores for height in admixed populations.*
   Bitarello, BD; Mathieson, I
   G3:Genes, Genomes, Genetics, Early Online, Sep. 2020

3. *Evolutionary and functional impact of common polymorphic inversions in the human genome.*
   Giner-Delgado, C; Villatoro, S; Lerga-Jaso, J; Gayà-Vidal, M; Oliva, M; Castellano, D; Pantano, L; **Bitarello, BD** et al. (12 additional authors)
   Nature Communications, 2019

4. *Signatures of Long-Term Balancing Selection in Human Genomes.*
   Bitarello, BD; Filippo, C; Teixeira, JC; Schmidt, JM; Kleinert, P; Meyer, D; Andrés, AM
   Genome Biology and Evolution, 2018

5. *Heterogeneity of dN/dS Ratios at the Classical HLA Class I Genes over Divergence Time and Across the Allelic Phylogeny.*
   Bitarello, BD; Francisco, RS; Meyer, D
   Journal of Molecular Evolution, 2016

6. *Mapping bias overestimates reference allele frequencies at the HLA genes in the 1000 genomes project phase I data.*
   Brandt, DY; Aguiar, VR; **Bitarello, BD**; Nunes, K; Goudet, J; Meyer, D
   G3: Genes, Genomes, Genetics, 2015

7. *HLA supertype variation across populations: new insights into the role of natural selection in the evolution of HLA-A and HLA-B polymorphisms.*
   Francisco, RDS; Buhler, S; Nunes, JM; **Bitarello, BD**; França, GS; Meyer, D; Sanchez-Mazas, A
   Immunogenetics, 2015

8. *Kiwi genome provides insights into evolution of a nocturnal lifestyle.*
   Le Duc, D; Renaud, G; Krishnan, A; Almén, MS; Huynen, L; Prohaska, SJ; Ongyerth, M; **Bitarello, BD** et al. 7 additional authors
   Genome Biology, 2015

9. *Development of polymorphic microsatellite markers for the human botfly, Dermatobia hominis (Diptera: Oestridae).*
   Bitarello, BD; Torres, TT; Lyra, ML; Azeredo-Espin, AML
   Molecular Ecology Resources, 2009

Review And Opinion Articles

10. *A genomic perspective on HLA evolution.*
    Meyer, D, Aguiar, VRC, **Bitarello, BD**, Brandt, D, Nunes, K
    Immunogenetics, 2017.

11. *Intercruzmento de humanos modernos e neandertais: novas perspectivas a luz da genética [Interbreeding of modern humans with Neanderthals: new perspectives in the light of genetics]*
    Bitarello, BD; Meyer, D
    Revista da Biologia, 2011.

12. *Projeto Genográfico e as implicações da popularização dos estudos de genealogia gênica [The Genographic Project and the implications of the popularization of Gene Genealogy Studies]*
    Bitarello, BD
    Revista da Biologia, 2009.

Research & Teaching Interests

Research interests
Human genetics, population genetics, population genomics, genomic medicine, predictive modeling, statistical genetics, genetic epidemiology, immunogenetics, evolutionary genetics, neuropsychiatric genetics, adaptive evolution, comparative genomics.

Teaching interests
Evolutionary biology, comparative genomics, phylogenetics, statistical genetics, history of human genetics, computational biology, population genetics, biostatistics, introduction to genetics, introduction to evolutinary biology, machine learning, programming with R.

Teaching & Mentoring Experience

University of Pennsylvania
Guest lecturer, 12/2020 (forthcoming)
Course: Introduction to Computational Biology and Biological Modeling (BIOL437). My lecture will be on Comparative Genomics, and I will assign homework. Length: 1.5 hours

Children's Hospital of Philadelphia
Teaching Assistant, 2020
Mini course: Intro to R for clinicians. Length: 4 hours.

University of São Paulo
Co-supervisor of Research Assistants, 2012-2015

Caroline Simões: We looked at data from my Ph.D. project. Caroline majored in Physics and is applying for grad school. Length: one year.

Débora Brandt: We explored HLA gene diversity in public databases. She pursued a Master's degree in our lab and is now a graduate student at UC Berkeley. Length: one semester.

Guest lecturer, 2012

Graduate cours in Evolutionary Genomics . I taught neutral coalescent simulations. Length: 4 hours

Self-employed
English Tutoring, 2008
I prepared material and tutored English to undergraduate students. Length: one semester

Elementary School in Campinas, Brazil
Supervised classroom experience, 2007
I prepared and delivered Science classes to fifth-graders under supervision. Length: 56 hours.

Scholarships & Awards

Best Graduate Student Paper, Genome Biology and Evolution [4], Society for Molecular Biology and Evolution, $2,000, 2019.

Spotlight Trainee Paper [4], American Society of Human Genetics, 2019.

Ph.D. scholarship grant, São Paulo Research Foundation, Grant # 11/12500-2, 2011–2016

Visiting graduate student scholarship grant, São Paulo Research Foundation, Grant # 12/19563-2, 2013-2014

Scholarship to attend the Summer Institute for Statistical Genetics in Seattle, USA, 2012

Master's Student Scholarship, São Paulo Research Foundation, Grant # 08/56502-6, 2009-2011.

1st place in entrance examination for the graduate program, Department of Genetics and Evolutionary Biology, University of São Paulo, 2009

Undergraduate research scholarship from São Paulo Research Foundation, Grant # 06/50793-3, 2006-2007

Invited talks & Contributed conference presentations

Ancestry Matters: why do polygenic risk scores remain limited to a few?, Annual Meeting of the Association of Genomic Diagnostics, Bonn, Germany, **Invited Talk**, 2020 (forthcoming)

What drives the reduced prediction accuracy of polygenic risk scores in non-European individuals?, Center for Theoretical and Evolutionary Genomics Seminar Series, Berkeley, USA, **Invited Talk**, 2020

Loss of predictive power of polygenic risk scores in admixed populations, The Allied Genetics Conference, Online, **Poster**, 2020

Low transferability of height polygenic risk scores in admixed ancestry populations, New York Area Population Genomics, New York, USA, **Contributed Talk**, 2020

Investigating the lack of transferability of polygenic risk scores in cohorts with admixed ancestry, Annual American Society of Human Genetics Meeting, Houston, USA, **Contributed Talk**, 2019

Polygenic risk scores perform poorly across populations, Annual American Society of Human Genetics Meeting, San Diego, USA **Contributed Talk**, 2017

Balancing selection in humans: insights from a novel SFS-based method, Annual Meeting of the Society for Molecular Biology and Evolution, Vienna, Austria, **Poster**, 2015

NCV: A site frequency spectrum based method to detect balancing selection in humans, Annual Meeting of the Society for Molecular Biology and Evolution, San Juan, Puerto Rico, **Poster**, 2014

Variation of dN/dS ratios at HLA genes over time and functional classes, Annual Meeting of the Society for Molecular Biology and Evolution, Chicago, USA, **Poster**, 2013

Time dependence of dN/dS measures at HLA loci under balancing selection, Annual Meeting of the Society for Molecular Biology and Evolution, Lyon, France, **Poster**, 2010

Research Related Skills

Programming languages: R, Bash scripting, sed/awk,LaTeX, markdown, Perl, Python (beginner)

Software: ldpred, plink, Hail, MSMS, SLiM, PAML, Rstudio, bcftools, vcftools, bedtools, HyPhy

Data Science & Statistics machine learning, linear modeling, data gathering, cleaning, exploration, visualization, reproducible research, documented code, statistical genetics, biostatistics, probability, MCMC

Languages: Portuguese (Native), English (Native), French (Intermediate), Spanish (Intermediate)

Academic, Professional & Community Service

SACNAS, 2020-Present
Society for Advancement of Chicanos/Hispanics Native Americans in Science
Roles: Review abstracts and scholarships and mentor younger scientists.

Brazilian Effort on Multifactorial Inheritance (BEMi), 2020-Present
Goal: address under-representation of non-Europeans in genomic studies.
Roles: Founding and Steering Committee member

Biomedical Postdoctoral Council Diversity Committee, 2020-Present
Roles: Mentoring Circles - lead a small mentoring circle for undergraduate and graduate students; advocate for diversity and inclusion for postdocs

***Ad hoc* Reviewer**
Abstracts: Biomedical Postdoctoral Council Research Symposium, University of Pennsylvania.
Manuscripts: Genome Biology and Evolution, Human Immunology, Scientific Reports, Molecular Ecology Resources, Peer Community in Evolutionary Biology.

Scientific Outreach
Guest speaker, "Bioinformatics Chat" podcast, Fall 2020 (upcoming)

My (mostly) science blog. Personal essays,tutorials, and short articles about scientific concepts and publications. https://bbitarello.github.io/post/

Consultant, 2015
Consultant on ancient DNA for identification of forensic skeletal remains from the military dictatorship in Brazil.

References

Iain Mathieson, Assistant Professor, Perelman School of Medicine, University of Pennsylvania, 415 Curie Blv, Philadelphia 19104, mathi@pennmedicine.upenn.edu

Aida Andrés, Associate Professor, University College London, Department of Genetics, Evolution and Environment, London, UK, a.andres@ucl.ac.uk

Diogo Meyer, Associate Professor, University of São Paulo, Department of Genetics and Evolutionary Biology, São Paulo, Brazil, diogo@ib.usp.br