

Guilherme Gainett

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EDUCATION

- Ph.D. University of Wisconsin-Madison, Department of Integrative Biology
2017-present
Advisor: Prof. Dr. Prashant P. Sharma
- M.S. University of São Paulo (Brazil), Zoology 2014-2016
Advisor: Prof. Dr. Rodrigo Hirata Willemart
- B.A. University of São Paulo (Brazil), Biological Sciences 2010-2013
Advisor: Prof. Dr. Rodrigo Hirata Willemart

RESEARCH EXPERIENCE

University of Wisconsin-Madison, Department of Integrative Biology 2017-present

I am conducting my Ph.D. research at the Sharma Lab. Advisor: Prof. Dr. Prashant P. Sharma

University of São Paulo (Brazil) – Evo-Devo lab, technician January-August 2017

I was a technician at the laboratory of Prof. Federico Brown-Almeida. **Main tasks:** Collecting and maintaining ascidians in laboratory; live plankton culture; lab purchases and stocks.

University of São Paulo (Brazil) - Master's Thesis February 2014-September 2016

Project: Internal morphology of the putative chemoreceptors in *Heteromitobates discolor* (Arachnida, Opiliones, Laniatores). Advisor: Prof. Dr. Rodrigo Hirata Willemart

My main goal was to identify the receptors (sensilla) responsible for olfaction in harvestmen of the suborder Laniatores.

Outcomes: (1) I showed that the previously unknown olfactory sensilla in Laniatores are in fact abundant and widespread phylogenetically, contrary to the earlier notion that harvestmen are mainly dependent on contact-chemoreception; (2) I presented the first morphological evidence of detectors of humidity and temperature in harvestmen, proposing a functional mechanism for how they perceive stimuli; (3) I showed that the putative detectors of humidity and temperature are widespread in Opiliones, and traced their evolution on the group's phylogeny.

Ernst-Moritz Arndt Universität Greifswald (Germany) - Master's Thesis internship June-December 2015

Project: Ultrastructure of sensilla chaetica in the harvestman *Heteromitobates discolor* (Arachnida, Opiliones, Laniatores). Advisor: Dr. Peter Michalik

I investigated the neuroanatomy of the sensilla responsible for taste in harvestmen (sensilla chaetica), to complement my initial master's project on olfactory sensilla. I learned protocols and techniques for transmission electron microscopy, being trained by Dr. Michalik and Dr. Carsten Müller. I was hosted at Dr. Gabriele Uhl's laboratory.

Harvard University (USA) - Master's Thesis internship September-December 2014

Advisor: Prof. Dr. Gonzalo Giribet

I intensively collected scanning electron microscopy data for the main master's project, interacting with PhD students and Post-docs, which greatly helped me with ideas and solutions for my project. With Dr. Prashant Sharma, I worked on the description of 4 harvestmen species, which are currently being prepared for publication with him and Dr. Giribet.

University of São Paulo (Brazil) - 2nd Undergraduate Research Project October 2012-July 2013

Project: Sensilla basiconica and falciform hair in Gonyleptoidea (Laniatores, Opiliones): Is there sexual dimorphism in different families? Advisor: Prof. Dr. Rodrigo Hirata Willermart

I comparatively investigated sexual dimorphisms in two sensory structures in harvestmen (sensilla basiconica, falciform hairs), to get clues about their function and their utility for systematics. The outcomes of this project set the ideas to write my master's thesis project, on the evolution of sensory structures in harvestmen and raised hypothesis that I would later test in my master.

Harvard University (USA) - 1st Undergraduate Research Project internship April-July 2012

Advisor: Prof. Dr. Gonzalo Giribet and former PhD student Prashant P. Sharma (Assistant Prof., University of Wisconsin-Madison)

I conducted part of data collection and analysis of my first scientific initiation project started in Brazil. I gained experience with operating the scanning electron microscope, coding morphological characters and general systematics of Opiliones (Arachnida).

University of São Paulo (Brazil) - 1st Undergraduate Research Project August 2011-July 2012

Project: Evolution of tarsal cuticular structures in Laniatores (Arachnida, Opiliones). Advisor: Prof. Dr. Rodrigo Hirata Willemart

We studied glandular openings and sensory structures as a new source of morphological characters for the systematics of Opiliones largest suborder (Laniatores). I employed scanning electron microscopy to sample the legs of species in 27 of the 30 known families and defined 3 new morphological characters. We showed that this character system is very informative (high phylogenetic signal, independent), and a source of new synapomorphies for delimiting superfamilies.

SCIENTIFIC PRODUCTS

Peer-Reviewed Papers

17. *Gainett, G., *†Crawford, A. R., †Klementz, B. C., †So, C., Baker, C. M., Setton, E. V. W., Sharma, P. P. (2022) Eggs to longlegs: Embryonic development of the harvestman *Phalangium opilio* (Opiliones), an emerging model arachnid. *Frontiers in Zoology* 19, 11. <https://doi.org/10.1186/s12983-022-00454-z> (*co-first author; †undergraduate co-author)
16. Ballesteros, J. A., Santibáñez-López, C. E., Baker, C. M., Benavides, L. R., Cunha, T. J., Gainett, G., Ontano, A. Z., Setton, E. V. W., Arango, C. P., Gavish-Regev, E., Harvey, M. S., Wheeler, W. C., Hormiga, G., Giribet, G., Sharma, P. P. (2022) Comprehensive species sampling and sophisticated algorithmic approaches refute the monophyly of Arachnida. *Molecular Biology and Evolution* 39(2):msac021 [Featured in the [New York Times](#)] (preprint: <https://doi.org/10.1101/2021.08.16.456573>)
15. *Gainett, G., *González, V. L., Ballesteros, J. A., Setton, E. V. W., Baker, C. M., Gargiulo, L. B., Santibáñez-López, C. E., Coddington, J. A., Sharma, P. P. (2021). The genome of a daddy-long-legs (Opiliones) illuminates the evolution of arachnid appendages. *Proceedings*

of the Royal Society B: Biological Sciences, 288: 20211168.

<https://doi.org/10.1098/rspb.2021.1168>. *co-first author (preprint:

<http://doi.org/10.1101/2021.01.11.426205>) [Featured on the journal cover] [Featured in [Science](#), [Nature](#), [The New York Times](#), [The Atlantic](#), [National Public Radio](#), [New Scientist](#), [CNET](#)]

14. Ontano, A. Z., **Gainett, G.**, Aharon, S., Ballesteros, J. A., Benavides, L. R., Corbett, K. F., Gavish-Regev, E., Harvey, M. S., Monsma, S., Santibáñez-López, C. E., Setton, E. V. W., Zehms, J. T., Zeh, J. A., Zeh, D. W., Sharma, P. P. (2021) Taxonomic sampling and rare genomic changes overcome long-branch attraction in the phylogenetic placement of pseudoscorpions. *Molecular Biology and Evolution*, 36(6), 2446–2467.
13. *Ballesteros, J. A., *Setton, E. V. W., Santibáñez López, C. E., Arango, C. P., Brenneis, G., Brix, S., Cano-Sánchez, E., Dandouch, M., Dilly, G. F., **Gainett, G.**, McAtee, S., McIntyre, L., Moran, A. R., Moran, R., López-González, P., Williamson, C., Woods, H. A., Wheeler, W. C., Sharma, P. P. (2021) Phylogenomic resolution of sea spider diversification through integration of multiple data classes. *Molecular Biology and Evolution*, 38(2), 686–701. <http://doi.org/10.1093/molbev/msaa228>; *co-first author [Featured in [Science](#)]
12. ***Gainett, G.**, *Ballesteros, J.A., Kanzler, C.R., Zehms, J.T., Zern, J.M., Aharon, S., Gavish-Regev, E., Sharma, P. P. (2020) Systemic paralogy and function of retinal determination network homologs in arachnids. *BMC Genomics* 21, 811. <https://doi.org/10.1186/s12864-020-07149-x>. *co-first author (preprint: <https://doi.org/10.1101/2020.04.28.067199>).
11. **Gainett, G.**, Willemart, R. H., Giribet, G., Sharma, P. P (2020) Convergent evolution of sexually dimorphic glands in an amphi-Pacific harvestmen family. *Invertebrate Systematics* 34, 871–892.
10. **Gainett, G.**, Sharma, P. P. (2020) Genomic resources and toolkits for developmental study of whip spiders (Amblypygi) provide insights into arachnid genome evolution and antenniform leg patterning. *EvoDevo* 11, 18. <https://doi.org/10.1186/s13227-020-00163-w>
9. Segovia, J. M., **Gainett, G.**, Willemart, R. H. (2020) Predatory behavior and sensory morphology of the whip spider *Charinus asturius* (Arachnida: Amblypygi). *Journal of Ethology* 38, 273–280. <https://doi.org/10.1007/s10164-020-00648-0>
8. Alegre-Barroso, A., **Gainett, G.**, Giribet, G. (2019) Two new species of the genus *Manahunca* Šilhavý, 1973 (Opiliones: Biantidae) from eastern Cuba, with the redescription of its type species and a survey of male glands in Stenostyginae. *Zootaxa*, v. 4686, n. 1, p. 83–111.
7. Aharon, S., Ballesteros, J. A., Crawford, A. R., **Gainett, G.**, Friske, K., Langford, B., Santibáñez López, C. E., Ya'aran, S., Gavish-Regev, E., Sharma, P. P. (2019) The anatomy of an unstable node: A Levantine relict precipitates phylogenomic dissolution of higher-level relationships of the armored harvestmen (Arachnida: Opiliones: Laniatores). *Invertebrate Systematics* 33, 697–717.
6. **Gainett G.**, Sharma, P. P., Fernandes, N., Pinto-da-Rocha, R., Giribet, G., Willemart, R. H. (2019) Evolution of a sensory cluster on the legs of Opiliones (Arachnida) informs multi-level phylogenetic relationships. *Zoological Journal of the Linnean Society* 187, 143–165.
5. **Gainett, G.**, Sharma, P. P., Giribet, G., Willemart, R. H. (2018) The sensory equipment of a sandokanid: an extreme case of tarsal reduction in harvestmen (Arachnida, Opiliones, Laniatores). *Journal of Morphology* 279, 1206–1223.

4. **Gainett, G.**, Sharma, P. P., Giribet, G., Willemart, R. H. (2018) Putative adhesive setae on the walking legs of the Paleotropical harvestman *Metibalonius* sp. (Arachnida: Opiliones: Podoctidae). *Journal of Arachnology* 46, 62-68.
3. **Gainett, G.**, Michalik, P., Müller, C. H. G., Giribet, G., Talarico, G., Willemart, R. H. (2017) Putative thermo-/hygroreceptive tarsal sensilla on the sensory legs of an armored harvestman (Arachnida, Opiliones). *Zoologischer Anzeiger* 270, 81-97. [cover article]
2. **Gainett, G.**, Michalik, P., Müller, C. H. G., Giribet, G., Talarico, G., Willemart, R. H. (2017) Ultrastructure of chemoreceptive tarsal sensilla in an armored harvestman and evidence of olfaction across Laniatores (Arachnida, Opiliones). *Arthropod Structure and Development* 46 (2), 178-195.
1. **Gainett, G.**, Sharma, P. P., Pinto-da-Rocha, R., Giribet, G. & Willemart, R. H. (2014) Walk it off: Predictive power of appendicular characters toward inference of higher-level relationships in Laniatores (Arachnida: Opiliones). *Cladistics* 30 (2), 120-138. [cover article]

In press

Santibáñez López, C.E., Aharon, S., Ballesteros, J.A., **Gainett, G.**, Baker, C. M., González-Santillán, E., et al. (in press). Phylogenomics of scorpions reveal a co-diversification of scorpion mammalian predators and mammal-specific sodium channel toxins. *Systematic Biology*. Pre-print: bioRxiv, 2020.11.06.372045.

In review

Book Chapter

Gainett, G., Montesinos, R., Dias, P.H.S. Metodologia da Inferência Filogenética [*Methods in Phylogenetic Inference*] (2017). In *Tópicos de Pesquisa em Zoologia*. Beneti, J., Montesinos, R., Giovannetti, V. Eds. Instituto de Biociências, Universidade de São Paulo, São Paulo, 198p. ISBN: 978-85-85658-72-4

Invited talks

2021 Universidade Federal do Piauí (UFPI) and Rede de Aracnologia Emergente Latina (RAEL), outreach virtual course “Aracnologia”; “Filogenômica e Evo-Devo”. [October 2021]
 2021 Museo Argentino de Ciencias Naturales (MACN) seminar; “Estruturas sensoriais em artrópodes em geral e em Opiliones” [August 2021].
 2020 Arthropoda Happy Hour, Grupo de Estudo de Artrópodes da Amazônia (GEAA), virtual webinar; “Evo-devo em Amblypygi: cavernas, irmãos cegos e os bebês de Weygoldt” [July 2020].

Presentations in Scientific Conferences

2022 Society for Integrative and Comparative Biology meeting; SICB 2022 (one poster)
 2021 Society for Developmental Biology 80th meeting (one poster)
 2021 Society for Integrative and Comparative Biology meeting; SICB 2021 (one talk)
 2020 VI Congreso Latinoamericano de Aracnología, Buenos Aires, virtual (one talk)
 2020 AAS Virtual Summer Symposium (one talk)

- 2019 International Congress of Arachnology, Christchurch, New Zealand (one talk, one poster)
- 2018 Global Invertebrate Genomics Alliance (GIGA) III, Willemstadt, Curaçao (one talk)
- 2018 American Arachnological Society Meeting, Ypsilanti, USA (one poster)
- 2016 International Congress of Arachnology, Golden, USA (one talk, one poster)
- 2015 29th European Congress of Arachnology, Brno, Czech Republic (one talk, one poster)
- 2014 IV Congreso Latinoamericano de Aracnología, Morélia, México (one talk)
- 2014 XXX Congresso Brasileiro de Zoologia, Porto Alegre, Brazil (poster)
- 2013 19th International Congress of Arachnology, Kentin, Taiwan (one talk)
- 2013 16th Biology Thematic Week, University of Sao Paulo, São Paulo, Brazil (poster)
- 2012 15th Biology Thematic Week, University of Sao Paulo, São Paulo, Brazil (poster)

SCHOLARSHIPS

- 2015 **Master's Research Scholarship: Scholarship for Research and Study Abroad. The State of São Paulo Research Foundation, FAPESP. Brazil.**
 Project: Ultrastructure of sensilla chaetica in the harvestman *Heteromitobates discolor* (Arachnida, Opiliones, Laniatores)
 FAPESP# 2014/07671-0
- 2014-2016 **Master's Research Scholarship. FAPESP. Brazil**
 Project: Internal morphology of the putative chemoreceptors in *Heteromitobates discolor* (Arachnida, Opiliones, Laniatores)
 FAPESP#2013/23189-1
- 2012-2013 **Undergraduate Research Scholarship. FAPESP. Brazil**
 Project: Sensilla basiconica and falciform hair in Gonyleptoidea (Laniatores, Opiliones): Is there sexual dimorphism in different families?
 FAPESP#2012/17483-1
- 2011-2012 **Undergraduate Research Scholarship. FAPESP. Brazil**
 Project: Evolution of tarsal cuticular structures in Laniatores (Arachnida, Opiliones)
 FAPESP#2011/11527-4

GRANTS AND AWARDS

- 2021 Student Research Grants Competition, Research Travel, UW-Madison; Funds for attending MBL Embryology course.
- 2021 Best Student Presentation Award DEDB, oral presentation, Society for Integrative and Comparative Biology meeting (SICB).
- 2020 Runner-up best oral student presentation in "Systematics and Biogeography", VI Congreso Latinoamericano de Aracnología 2020.

- 2020 John Jefferson Davis Fund, UW-Madison, Integrative Biology. Travel grant for attending SICB 2021 and VI Congreso Latinoamericano de Aracnología (virtual).
- 2020 Graduate Summer Research Award, John & Virginia Emlen Award Fund for Outstanding Graduate Work, UW-Madison.
- 2019 Student Research Grants Competition – Conference Funds for having attended GIGAIII meeting in Curaçao (2018); UW-Madison.
- 2019 Graduate Summer Research Award, John & Virginia Emlen Award Fund for Outstanding Graduate Work, UW-Madison.
- 2019 Runner-up best oral student presentation in Morphology, Physiology & Silk. 21th International Congress of Arachnology, New Zealand.
- 2018 Laudier Histology Early Career Travel Grant. Grant for attending the 21th International Congress of Arachnology, New Zealand.
- 2018 John Jefferson Davis Fund, UW-Madison, Integrative Biology. Travel grant for attending the International Congress of Arachnology, New Zealand.
- 2018 Oscar and Jan Francke Student Research Fund, International Society of Arachnology
- 2018 AAS travel grant, American Arachnological Society Meeting, Eastern Michigan University, Ypsilanti, MI, USA.
- 2018 Graduate Summer Research Award, John & Virginia Emlen Award Fund for Outstanding Graduate Work, UW-Madison.
- 2018 John Jefferson Davis Fund, UW-Madison, Integrative Biology. Travel grant for attending GIGAIII meeting, Curaçao.
- 2016 Laudier Histology Travel Grant. 20th International Congress of Arachnology, Denver, CO, USA.
- 2015 Student Grant for attending the 29th European Congress of Arachnology, Masaryk University and Czech Arachnological Society.
- 2015 Best poster in Taxonomy and Genetics. 29th European Congress of Arachnology, Masaryk University and Czech Arachnological Society.
- 2013 Student Grant for attending the 19th International Congress of Arachnology, Kentin, Taiwan.
- 2012 2nd place prize in academic exposition, 15th Biology Thematic Week, Bioscience Institute, University of São Paulo.

PEER-REVIEW and EVALUATION

Journals:

- 2020 Zoologischer Anzeiger
 2018 Canadian Journal of Zoology
 2017 Journal of Arachnology
 2017 Arthropod Structure and Development

Abstract review:

- 2019 Congresso Brasileiro de Zoologia [Brazilian Congress of Zoology]

Evaluation committee:

2017, 2021 Feira Brasileira de Ciências e Engenharia (FEBRACE) [Brazilian Fair of Sciences and Engineer]

TEACHING EXPERIENCE

COLLEGE LEVEL

Graduate Teaching Assistantship

- 2019 Zoo300/Zoo301: Invertebrate Biology and Evolution/Lab (University of Wisconsin-Madison, USA)
2018 Zoo300/Zoo301: Invertebrate Biology and Evolution/Lab (University of Wisconsin-Madison, USA)
2014 BIZ 0213: Invertebrates (University of Sao Paulo, Brazil)

Undergraduate Teaching Assistantship

- 2013 BIZ 0213: Invertebrates (University of Sao Paulo, Brazil)
2013 BIZ 0426: Arachnology (University of Sao Paulo, Brazil)

Courses Given

- 2016 IV Curso de Verão em Zoologia (*4th Summer Course in Zoology*) (University of Sao Paulo, Brazil); Lectures: “Introduction to Systematics”, “Introduction to Electron Microscopy”
2015 III Curso de Verão em Zoologia (*3rd Summer Course in Zoology*) (University of Sao Paulo, Brazil); Lecture: “Methods in Phylogenetic Inference”
2014 II Curso de Verão em Zoologia (*2nd Summer Course in Zoology*) (University of Sao Paulo, Brazil); Lecture: “Harvestmen Systematics”

OUTREACH

- 2020 Darwin Day outreach event for elementary school children, at UW-Madison
2019 Mini-lectures with live arthropods at Centro Hispano’s “Juventud” after school, Toki Middle School, Madison, WI
2017 Darwin Day outreach event for elementary school children, at UW-Madison
2016 VIII Simpósio do Cientista Aprendiz [*8th Symposium of Science Apprentice*], Colégio Dante Alighieri, São Paulo, Brazil
I was a volunteer participating of the examining committee of scientific initiation projects of 12-16 years old students

Feb-Dec/2010 Estação Biologia [Biology Station], University of Sao Paulo.

I was a volunteer of this extension project, which receives students from primary and secondary schools at the Biosciences Institute of USP, with educational and science reach purposes. I helped receiving the students and conducting pedagogic activities to diffuse Biology.

ORGANIZING COMMITTEE

- 2016 IV Curso de Verão em Zoologia (*4th Summer Course in Zoology*) (University of Sao Paulo)
2015 III Curso de Verão em Zoologia (*3rd Summer Course in Zoology*) (University of Sao Paulo)
2013 XXXI Encontro Anual de Etologia [*31st Annual Meeting of Ethology*], Sao Paulo, Brazil

CULTURAL EXCHANGE PROGRAM

Jun/2008 Lions-Rotary Youth Exchange Program.

I lived for one month with a family in Vienna (Austria). I learned about the country's culture and also interacted with exchange students from countries all over the world, improving my English skills as well.

SOCIETY MEMBERSHIPS

Oct/2020-present Society for Integrative and Comparative Biology

May/2020-present Society for Developmental Biology

Sep/2019-2020 Zoology Graduate Student Organization (President), UW-Madison

Jan/2016-present Student member, American Arachnological Society

Feb/2018-present Student member, International Society of Arachnology

PROFESSIONAL DEVELOPMENT

2021 Embryology: Concepts & Techniques in Modern Developmental Biology; Marine Biological Laboratory, Woods Hole, MA, USA.

LANGUAGES

Portuguese Native

English Fluent

Spanish Intermediate

German Basic