

Lilian Caesar

Postdoctoral researcher

bees | microbiomes | omics to wet lab | eco-evolution

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Professional appointments

Postdoctoral researcher , Department of Biology, Indiana University Bloomington, IN NSF-BII GEMS.	2021 - present
Graduate student researcher , Department of Biology, Universidade Federal do Rio Grande do Sul, Porto Alegre, Brazil.	2016 - 2020

Education

Universidade Federal do Rio Grande do Sul, Porto Alegre, Brazil. Ph.D. in Biological Sciences (Genetics and Molecular Biology). Thesis: Annual syndrome of <i>Melipona quadrifasciata</i> stingless bee: the role of symbionts, behavior and environment.	2016 - 2020
Universidade do Vale do Rio dos Sinos, São Leopoldo, Brazil. Teaching Credential in Biological Sciences. Honors thesis: Effects of a life without <i>Wolbachia</i> : differential expression of methyltransferase 2 and changes in fitness of <i>Drosophila willistoni</i> and <i>D. paulistorum</i> .	2011 - 2015

Peer-reviewed publications

Caesar L, Barksdale C, Valiati VH, Newton I. Spatial segregation and cross-kingdom interactions drive stingless bee hive microbiome assembly. *Nat Commun.* 2025 Nov 25. doi: 10.1038/s41467-025-66678-9. Epub ahead of print. PMID: 41290716.

Kelliher JM, Mirzayi C, Bordenstein SR, Oliver A, Kellogg CA, Hatcher EL, Berg M, Baldrian P, Aljumaah M, Miller CML, Mungall C, Novak V, Palucki A, Smith E, Tabassum N, Bonito G, Brister JR, Chain PSG, Chen M, Degregori S, Dundore-Arias JP, Emerson JB, Moreira C Fernandes V, Flores R, Gonzalez A, Hansen ZA, Jackson SA, Moustafa AM, Northen TR, Pariente N, Pett-Ridge J, Record S, Reji L, Reysenbach AL, Rich VI, Richardson L, Roux S, Schriml LM, Shabman RS, Sierra MA, Sullivan MB, Sundaramurthy P, Thibault KM, Thompson LR, Tighe S, Vereen E; **STREAMS Consortium**; Eloë-Fadrosch EA. STREAMS guidelines: standards for technical reporting in environmental and host-associated microbiome studies. *Nat Microbiol.* 2025 Dec;10(12):3059-3068. doi: 10.1038/s41564-025-02186-2. Epub 2025 Dec 1. PMID: 41326814.

Ganote CL, **Caesar L**, Rice DW, Whitaker RJ, Newton ILG. Evolutionary trends in *Bombella apis* CRISPR-Cas systems. *mSystems.* 2025 Jul 22;10(7):e0016625. doi: 10.1128/msystems.00166-25. Epub 2025 Jun 18.

Techer MA, Chakrabarti P, **Caesar L**, Eynard SE, Farrell MC, Foster LJ, Gorrochategui-Ortega J, Henriques D, Li-Byarlay H, Morré JT, Newton ILG, Parejo M, Pinto MA, Vignal A, Zarraronaindia I, McAfee A. Standard methods and good practices in *Apis* honey bee omics research. *J. Apic. Res.* 2025 64(2), 307–402. doi: <https://doi.org/10.1080/00218839.2025.2455852>

Muniz VA, de Melo Katak R, **Caesar L**, de Oliveira JC, Rocha EM, de Oliveira MR, da Silva GF, Roque RA, Marinotti O, Terenius O, de Andrade EV. Genomic and morphological features of an Amazonian *Bacillus thuringiensis* with mosquito larvicidal activity. *AMB Express.* 2025 Mar 5;15(1):39. doi: 10.1186/s13568-025-01850-4.

Caesar L, Rice DW, McAfee A, Underwood R, Ganote C, Tapy DR, Foster LJ, Newton ILG. Metagenomic analysis of the honey bee queen microbiome reveals low bacterial diversity and Caudoviricetes phages. *mSystems*. 2024 Feb 20;9(2):e0118223. doi: 10.1128/msystems.01182-23. Epub 2024 Jan 23.

Caesar L, Haag KL. Tailed bacteriophages (Caudoviricetes) dominate the microbiome of a diseased stingless bee. *Genet Mol Biol*. 2024 Jan 19;46(3 Suppl 1):e20230120. doi: 10.1590/1678-4685-GMB-2023-0120.

Haag KL, **Caesar L**, da Silveira Regueira-Neto M, de Sousa DR, Montenegro Marcelino V, de Queiroz Balbino V, Torres Carvalho A. Temporal Changes in Gut Microbiota Composition and Pollen Diet Associated with Colony Weakness of a Stingless Bee. *Microb Ecol*. 2023 May;85(4):1514-1526. doi: 10.1007/s00248-022-02027-3. Epub 2022 May 6.

Ellwanger JH, Fearnside PM, Ziliotto M, Valverde-Villegas JM, Veiga ABGD, Vieira GF, Bach E, Cardoso JC, Müller NFD, Lopes G, **Caesar L**, Kulmann-Leal B, Kaminski VL, Silveira ES, Spilki FR, Weber MN, Almeida SEM, Hora VPD, Chies JAB. Synthesizing the connections between environmental disturbances and zoonotic spillover. *An Acad Bras Cienc*. 2022 Sep 19;94(suppl 3):e20211530. doi: 10.1590/0001-3765202220211530.

Caesar L, Lopes AMC, Konzen ER, Radaeski JN, Bauermann SG, Pombert JF, Sattler A, Blochtein B, Carvalho AT, Haag KL. Longitudinal survey reveals delayed effects of low gene expression on stingless bee colony health. *J. Apic. Res*. 2021 61(5), 654–663. Doi: <https://doi.org/10.1080/00218839.2021.1962123>

Ellwanger JH, Kulmann-Leal B, Kaminski VL, Valverde-Villegas JM, Veiga ABGD, Spilki FR, Fearnside PM, **Caesar L**, Giatti LL, Wallau GL, Almeida SEM, Borba MR, Hora VPD, Chies JAB. Beyond diversity loss and climate change: Impacts of Amazon deforestation on infectious diseases and public health. *An Acad Bras Cienc*. 2020 Apr 17;92(1):e20191375. doi: 10.1590/0001-3765202020191375. PMID: 32321030.

Caesar L, Cibulski SP, Canal CW, Blochtein B, Sattler A, Haag KL. The virome of an endangered stingless bee suffering from annual mortality in southern Brazil. *J Gen Virol*. 2019 Jul;100(7):1153-1164. doi: 10.1099/jgv.0.001273. Epub 2019 Jun 6.

Díaz S, de Souza Urbano S, **Caesar L**, Blochtein B, Sattler A, Zuge V, Haag KL. Report on the microbiota of *Melipona quadrifasciata* affected by a recurrent disease. *J Invertebr Pathol*. 2017 Feb;143:35-39. doi: 10.1016/j.jip.2016.11.012. Epub 2016 Nov 23.

Sassi FA, **Caesar L**, Jaeger M, Nör C, Abujamra AL, Schwartsmann G, de Farias CB, Brunetto AL, Lopez PL, Roesler R. Inhibitory activities of trichostatin a in U87 glioblastoma cells and tumorsphere-derived cells. *J Mol Neurosci*. 2014 Sep;54(1):27-40. doi: 10.1007/s12031-014-0241-7. Epub 2014 Jan 25.

Manuscripts in review

Miller D, **Caesar L**, Ganote C, López-Madrigal S, Rice DW, Robinson C, Land A, Lewis J, Newton, ILG. Nested Connections: Local Phage and Broad Plasmid Sharing in the Honey Bee Mobilome. *In review*. bioRxiv, 2025, doi: <https://doi.org/10.1101/2025.10.31.685865>

Nishiduka E, Hill T, Bonilla B, **Caesar L**, Valenzuela-Leon P, Marinotti O, Calvo E. Chromosome-level genome assembly and developmental transcriptome of *Aedes triseriatus*, vector of La Crosse virus. *In review*.

Research experience

Postdoctoral research, Department of Biology, Newton Lab.
Indiana University, Bloomington, IN.

2021 - present

- *Microbiome ecology and evolution* — summary of methods:

amplicon sequencing, long and short-read genomics, long and short-read metagenomics, bacteria/fungi/phage isolation, microbial cultures optimization, growth curves, competition assays, field work sampling, DNA extractions, PCR, *in vivo* experiments with larvae and adult bees in monitoring cages.

Doctoral research, Evolutionary Genomics Laboratory. Universidade Federal do Rio Grande do Sul, Porto Alegre, Brazil. - <i>Bee health and microbiome</i> — summary of methods: field work sampling, building an apiary, <i>in vivo</i> experimentation with bee hives, DNA and RNA extractions, RT-qPCR, amplicon sequencing, RNAseq virome metagenomes.	2016 - 2020
Doctoral research, Pombert Lab (Computational Genomics). Illinois Institute of Technology, Chicago, IL. - <i>Bee health transcriptomics</i> — summary of methods: RNAseq, scripts development in Bash and Perl.	Feb 2019

Honors, awards, and grants

Best Presentation Award , Microbiome Virtual International Forum (MVIF.45). \$200	2026
Collaborator/named fellow on USDA AFRI competitive grant 2024-67013-42302. “The interplay between queenliness, the honey bee microbiome, and colony health”. \$749,651.00	2024-2027
Co-PI on NSF-BII GEMS New projects call , project “Effects of diet and Environmental stressors on the microbiota mobilome from honey bee queens”. Genomics and Eco-evolution of Multi-Scale Symbioses (GEMS) Institute, University of Illinois at Urbana-Champaign, IL. \$148,964	2023 - 2025
Cleland travel award (Plant & Fungal Biology). Indiana University, Bloomington, IN. \$1,000	2022 - 2023
Provost's Travel Award for Women in Science. Indiana University, Bloomington, IN. \$1,400	2022 - 2023
Best talk at the Genomics and eco-evolution of multi-scale symbiosis (GEMS) Annual Retreat. Indiana University, Bloomington, IN.	2022
Travel Grant from European Molecular Biology Organization (EMBO). €400	2018
Co-author/named fellow on CNPq/MCTIC/IBAMA/ABELHA N° 32/2017 grant. “Bee plagues: looking for diseases and understanding the chemical interaction between Meliponini and Phoridae”. R\$500,000	2018 - 2020
Travel Grant for scientific meetings. Universidade Federal do Rio Grande do Sul, Porto Alegre, Brazil. R\$1,600	2017 – 2018
Ph.D. Research Scholarship. Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES). R\$106,000	2016 - 2020
Best undergraduate work in Evolution. IX international Symposium of Ecology, Genetics and Evolution of <i>Drosophila</i> , Brasília, Brazil.	2015
Undergraduate final work approved with honors. Universidade do Vale do Rio dos Sinos, São Leopoldo, Brazil.	2015

Undergraduate Research Scholarship. Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq). <i>R\$12,000</i>	2013 - 2015
Undergraduate Research Scholarship. Instituto do Câncer Infantil (ICI). <i>R\$5,000</i>	2012 - 2013

Selected and invited presentations

Microbiome Virtual International Forum, MVIF #45. Global. Talk: A hive divided: how space and species sculpt stingless bee microbiomes	2026
Entomology 2025. Portland, OR. Invited talk: A hive divided: how space and species sculpt stingless bee microbiomes	2025
ASU Insect Seminar. Arizona State University, Tempe, AZ. Invited talk: A hive divided: how space and species sculpt stingless bee microbiomes	2025
Lake Arrowhead Microbial Genomics Meeting. Lake Arrowhead, LA 2024 Talk: Her royal phages: The dynamics of honey bee queen microbiome and its mobilome.	
ASM Microbe 2024. Atlanta, GA. Talk: Her royal phages: How honey bee queen mobilome shapes the microbiome.	2024
Entomology 2024. Phoenix, AZ. Talk: The dynamics of honey bee queen microbiome and its Mobilome.	2024
9th Conference on Beneficial Microbes. Madison, WI. Poster: Her royal phages: How honey bee queen mobilome shapes the microbiome.	2024
Animal-Microbe Symbioses GRC. Lucca (Barga), LU, Italy. Poster: Bacteria associated with the larval stage of eusocial bees have a selective antifungal role.	2023
Seminar from the Program in Biological Sciences, Universidade do Vale do Rio dos Sinos. São Leopoldo, Brazil. Invited talk: Omics approaches to study bee ecology and evolution - from symbionts to behavior.	2022
Genomics and eco-evolution of multi-scale symbiosis (GEMS) Annual Retreat. Bloomington, IN. Talk: Bacteria and fungi interactions in the microbiome of stingless bees.	2022
8th Conference on Beneficial Microbes. Madison, WI. Talk: Diversity, Evolution and Role of the <i>Bombella</i> Bacteria Associated with Stingless Bees.	2022
ASM Microbe 2022. Washington, DC. Poster: Diversity, Evolution and Role of the <i>Bombella</i> Bacteria Associated with Stingless Bees.	2022
XVIII International Union for the Study of Social Insects International Congress. Guarujá, Brazil. Poster: Viruses are not the cause of the annual <i>Melipona quadrifasciata</i> syndrome.	2018

Ecological Immunology Workshop on Insect immunity: genomics, microbiome, applications. Blossin, Germany. 2017
 Poster: Looking for the footprints of disease in a stingless bee hologenome.

Teaching experience

Lecturer/organizer of NMDC workshop in Portuguese/Spanish: Jul 2024
 Microbiome data stewardship, management and standardized bioinformatic workflows. Online via Zoom. 50 students.
 doi: 10.5281/zenodo.13941560

Lecturer/teaching assistant at MBL Microbial Diversity: *in silico* Jul 2023
 hunting for viruses and mobile genetic elements in genomic and metagenomic datasets. Marine Biological Laboratory, Woods Hole (Falmouth), MA. 30 students.

Lecturer at GEMS Bioinformatic Summer Course: From long read sequencing to comparative genomics. Institute of Genomics and eco-evolution of multi-scale symbiosis (GEMS) at University of Illinois Urbana-Champaign, IL, and Indiana University, Bloomington, IN. 20 students. Jul 2022

Guest lecture: Bee health and disease emergence. Nov 2020
 Apiculture class from the Program in Ecology and Evolution of Biodiversity, Pontificia Universidade Católica do Rio Grande do Sul (PUCRS), Porto Alegre, Brazil. 15 students.

Teaching internship. Evolutionary Biology. 2017 - 2018
 Universidade Federal do Rio Grande do Sul, Porto Alegre, Brazil. 20 students.

Teaching assistant. Cell and Molecular Biology. 2013 - 2014
 Universidade do Vale do Rio dos Sinos, São Leopoldo, Brazil. Lecturer: Dr. Débora Gazzana Flores. 100 students.

Teaching assistant. Evolutionary Biology. 2012
 Universidade do Vale do Rio dos Sinos, São Leopoldo, Brazil. Lecturer: Dr. Raquel de Castilhos Fortes. 100 students.

Mentoring

Indiana University, Bloomington, IN

- Carrie Ganote, Informatics PhD candidate 2022 - present
- Chris Robinson, EEB PhD candidate 2022 - present
- Amadeus Wagner, Biology undergraduate student 2024 - present
- Carlin Barksdale, Biochemistry undergraduate student 2023 - 2024
- Leila Ahree Sidahmed, Biology undergraduate student 2023
- Xutong (Stella) Guo, Biology undergraduate student 2022 - 2023
- Isaac Maurer, Biotechnology undergraduate student 2022 - 2023

Universidade Federal do Rio Grande do Sul, Porto Alegre, Brazil

- Victor Montenegro Marcelino, PhD student in Biological Sciences (Genetics and Molecular biology) 2019 - 2020
- Anelise Lopes, Biology undergraduate student 2017 - 2019
- Raquel Mocellin, Biology undergraduate student 2018 - 2019
- Priscila Poletti, Biology undergraduate student 2016 - 2017

Universidade do Vale do Rio dos Sinos, São Leopoldo, Brazil

- Samantha Scrinz, Biology undergraduate student 2016 - 2017
 - Nicole Oliveira Paiva, Biology undergraduate student 2016 - 2017

Service, community and outreach

Peer reviewed for Nature Microbiology; Nature Communications; ISME Journal; mBio; mSystems; Cell Reports; Microbial Ecology; Microbiome; Proceedings B; Animal Microbiome; G3: Genes, Genomes, Genetics; Environmental DNA; Current Microbiology; Ecology and Evolution; Apidologie; Symbiosis; Journal of Economic Entomology.

2025 Champion for National Microbiome Data Collaborative, led by Lawrence Berkeley National Laboratory, University of California, CA.

Mentor for Indigenous & Local Community Leaders (Amazon/Cerrado biomes). 2025-2026. Pollinators Fellowship Program, Meli Bees (<https://www.meli-bees.org/pollinators-fellowship/>).

Mentor for 2024 Jim Holland Summer Science Research Program, Indiana University, IN.

2024 Ambassador for National Microbiome Data Collaborative, led by Lawrence Berkeley National Laboratory, University of California, CA.

Lead NSF BII GEMS Bioinformatics accountability group. 2024-2026. Genomics and Eco-evolution of Multi-Scale Symbioses (GEMS) Institute, University of Illinois at Urbana-Champaign, IL; Indiana University, IN.

Discussion Leader at Animal-Microbe Symbioses 2023 GRS, Lucca (Barga), LU, Italy.

Thesis Committee Member, 2 Master's theses (2022, 2023), Universidade do Vale do Rio dos Sinos, Brazil.

Manual of Best Practices for the Management of Stingless Bee Colonies. 2020. Printed and online version distributed to Brazilian beekeepers.

Invited talk about bee health for the VIII Beekeeping Field Day at the Agronomic Study Station. 2018. Universidade Federal do Rio Grande do Sul, Porto Alegre, Brazil.

Invited talk about bee health for the XXII National Beekeeping Congress VII National Meliponiculture Congress. 2018. Joinville, Brazil.

Invited talk at the XXI State Beekeeping Seminar and XIV State Meliponiculture Meeting. 2017. São Gabriel, Brazil.

Language skills

English (fluent), Spanish (intermediate), German (beginner), Portuguese (fluent - native).

Professional references

Dr. Irene L. G. Newton – email: irnewton@iu.edu | phone: 1-812-855-3883

Postdoctoral advisor

Professor of Biology, Indiana University.

915 E 3rd St, Bloomington, IN 47405.

Dr. Katy D. Heath – email: kheath@illinois.edu | phone: 1-217-265-5473

PI from NSF-BII GEMS

Professor of Plant Biology, Carl R. Woese Institute for Genomic Biology, University of Illinois at Urbana-Champaign.

286 Morrill Hall, 505 S. Goodwin Ave., Urbana, IL 61801

Dr. Adam Dolezal – email: adolezal@illinois.edu | phone: 1-217-300-6762

Collaborator

Associate Professor of Entomology, University of Illinois at Urbana-Champaign.
505 S. Goodwin Ave. Urbana, IL 61801

Dr. Rachel Whitaker – email: rwhitakr@illinois.edu | phone: 1-217-244-8420

co-PI from NSF-BII GEMS, collaborator

Professor of Microbiology, Carl R. Woese Institute for Genomic Biology, University of Illinois at
Urbana-Champaign.

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