

Curriculum Vitae

Sara A. Carioscia

February 17, 2025

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Education

- 2019– **Johns Hopkins University**, Baltimore, MD
PhD Candidate in Cell, Molecular, Developmental Biology and Biophysics
Advisor: Rajiv C. McCoy
- 2017 **Georgetown University**, Washington, DC
BS in Biology; Classical Studies

Professional experience

- 2023 Computational Biology Summer Associate
Tempus Labs, Chicago, IL
- 2017–2019 Science Policy Fellow
Science and Technology Policy Institute, Washington, DC
- 2013–2017 Undergraduate Researcher
Georgetown University Department of Biology

Fellowships and funding

- 2023 National Science Foundation ACCESS Computing Allocation (750,000 credits)
- 2021–2026 National Science Foundation Graduate Research Fellowship (\$138,000)
- 2021–2022 Johns Hopkins Center for Educational Resources Technology Fellowship (\$5,500)
- 2016 Georgetown University Research Opportunities Program (\$3,500)
- 2015 Zukowski-Kolleng Fellowship, Georgetown University (\$3,500)

Awards

- 2024 Margolies Travel Award, Johns Hopkins Department of Biology (\$2,000)
- 2024 1st Place Poster, Maryland Genetics, Epidemiology & Medicine Genetics Research Day
- 2021 Victor G. Corces Teaching Award, Johns Hopkins Department of Biology (\$400)

2021 Excellence in Teaching Award, Johns Hopkins School of Arts and Sciences (Finalist)
 2018 Secure World Foundation Young Professionals Scholarship (\$1,500)

Publications & presentations

IN REVIEW

2024 Yang, A., Carioscia, S.A., Isada, M., McCoy, R.C. "Approximate Bayesian computation supports a high incidence of chromosomal mosaicism in blastocyst-stage human embryos." *bioRxiv*. Mentees. <https://www.biorxiv.org/content/10.1101/2024.11.26.625484v1>

RESEARCH ARTICLES

2022 Carioscia, S.A.,* Weaver, K.J.,* Bortvin, A.N., Pan, H., Ariad, D., Bell, A.D., McCoy, R.C. "A method for low-coverage single-gamete sequence analysis demonstrates adherence to Mendel's first law across a large sample of human sperm." *eLife*, <https://doi.org/10.7554/eLife.76383> *Equal contribution

2019 Carioscia, S.A., Linck, E., Crane, K., Lal, B. "Assessment of the utility of a government strategic investment fund for space." *New Space Journal* 7, no. 4. doi.org/10.1089/space.2019.0006

2016 Rydzewski, W., Carioscia, S.A., Lievano, G., Lynch, V., Patten, M. "Sexual antagonism and meiotic drive cause stable linkage disequilibrium and favour reduced recombination on the X chromosome." *Journal of Evolutionary Biology* 29, no. 6. [doi/abs/10.1111/jeb.12866](https://doi.org/10.1111/jeb.12866)

2015 Patten, M., Carioscia, S.A., Linnen, C. "Biased introgression of mitochondrial and nuclear genes: a comparison of diploid and haplodiploid systems." *Molecular Ecology* 24, no. 20. [doi/abs/10.1111/mec.13318](https://doi.org/10.1111/mec.13318)

COMMENTARY

2024 Carioscia, S.A., McCoy, R.C. "A rare genetic variant biases maternal meiotic recombination toward risk of pregnancy loss." *Nature Structural and Molecular Biology*, [10.1038/s41594-024-01269-8](https://doi.org/10.1038/s41594-024-01269-8)

ORAL PRESENTATIONS

April 2025 **Mutations in Time and Space**, Cambridge, MA
 Common variation in core meiosis genes shapes human recombination phenotypes and aneuploidy risk

2024 **Johns Hopkins Chromatin and Chromosomes Workshop**, Baltimore, MD
 Variants in SMC1B associate with increased incidence of maternal meiotic aneuploidy in 129,479 human IVF embryos

2024 **Department of Biology Retreat**, Liberty Mountain, PA (invited talk)
 Maternal genetic sources of variation in human embryonic aneuploidy

2024 **Biology of Genomes Conference**, Cold Spring Harbor Laboratories (CSHL), NY
 Preimplantation genetic testing data from 129,479 IVF embryos reveals the landscape of

haplo- versus triplo-sensitivity prior to blastocyst formation

- 2023 **Tempus Labs Translational Research**, Chicago, IL
Assessing data and pipeline performance via unit and integration tests
- 2020 **Space Education and Strategic Applications Conference**, virtual
Assessing the utility of government strategic investment in space
- 2019 **White House Office of Science and Technology Policy (OSTP)**, Washington, DC
The commercial development of supersonic aircraft
- 2018 **69th International Astronautical Congress**, Bremen, Germany
Evaluating government's role in space commercialization
- 2018 **American Institute of Aeronautics and Astronautics (AIAA)**, Washington, DC
Challenges and ways forward in on-orbit servicing, assembly, and manufacturing
- 2018 **Intelligence Community Space Board**, Fairfax, Virginia
Global trends in space traffic management
- 2018 **White House Office of Science and Technology Policy (OSTP)**, Washington, DC
Improving controls on exports and foreign investment in the U.S. space industry

POSTER PRESENTATIONS

- 2024 **Maryland Genetics, Epidemiology & Medicine Genetics Research Day**, Baltimore, MD
Mapping genetic loci associated with embryo count in a dataset of 156,828 IVF embryos
- 2024 **The Allied Genetics Conference (TAGC), Genetics Society of America**, Washington, DC
Mechanisms and fitness consequences of human embryonic aneuploidy inferred from 129,479 blastocyst-stage embryos
- 2023 **American Society of Human Genetics (ASHG)**, Washington, DC
Preimplantation genetic testing data from 129,479 IVF embryos reveals the landscape of haplo- versus triplo-sensitivity prior to blastocyst formation
- 2021 **15th Annual Genomics and Bioinformatics Symposium**, virtual
Strict adherence to Mendel's First Law across a large sample of human sperm
- 2021 **Biology of Genomes, Cold Spring Harbor Laboratory**, virtual
Haplotype phasing, genotype imputation, and mapping of meiotic crossovers from sparse gamete sequencing data
- 2020 **The Allied Genetics Conference (TAGC), Genetics Society of America**, virtual
Simulating the impact of Neandertal introgression on the distribution of fitness effects of human genetic variation
- 2019 **13th Annual Genomics and Bioinformatics Symposium**, Baltimore, MD
Simulating the impact of Neandertal introgression on the distribution of fitness effects of human genetic variation
- 2017 **Georgetown University Research Conference**, Washington, DC
Effects of chimerism on sibling rivalry in marmosets
- 2015 **Georgetown University Research Conference**, Washington, DC
Biased introgression of mitochondrial and nuclear genes: a comparison of diploid and haplodiploid systems

GOVERNMENT REPORTS

- 2019 The commercial development of civilian supersonic aircraft.
www.ida.org/commercial-development-of-civilian-supersonic-aircraft
- 2019 Short-term training opportunities in cancer informatics with implications for the emerging National Cancer Institute (NCI) Informatics Technology for Cancer Research (ITCR) Program.
- 2019 Review of U.S. government policy on life sciences dual-use research of concern.
- 2019 Personal genomic data case studies: ownership, sharing, and privacy issues.
- 2019 Evaluation of a human mission to Mars by 2033.
www.ida.org/evaluation-of-a-human-mission-to-mars-by-2033
- 2019 Toward the development of national planetary protection policy.
<https://www.ida.org/research-and-publications/publications/all/t/to/towards-the-development-of-a-national-planetary-protection-policy>
- 2019 Assessment of the utility of a government strategic investment fund for space.
www.ida.org/assessment-of-a-government-strategic-investment-fund-for-space
- 2018 Ways forward: on-orbit servicing, assembly, and manufacturing of spacecraft.
www.ida.org/D-10445
- 2018 Federally-funded infectious disease ‘-omics’ databases.
- 2018 Examination of Federal assessment capabilities for ARPA-E.
- 2018 Improving controls on exports and foreign investment in space technologies.
- 2018 Global trends in space situational awareness and space traffic management.
www.ida.org/D-9074

OTHER MATERIAL

- 2020 “Biotech, grad school, networking, and putting yourself out there.”
Titus Talks (Podcast). <https://alexandertitus.com/Carioscia>
- 2020 “Science in Space”. Splash Weekly (Podcast).
- 2019 Lal, B., Crane, K., Carioscia, S.A., Linck, E. “Strategic role of government in space commercialisation.” *Room EU* 21(3). room.eu.com/strategic-role-of-government-in-space-commercialisation
- 2019 Linck, E., Carioscia, S.A., Crane, K., Lal, B. “Preferred policy instruments to achieve U.S. Government goals for human spaceflight and private sector space markets.”
70th International Astronautical Congress (Conference Paper).
- 2018 Carioscia, S.A., Linck, E., Crane, K., Lal, B. “Evaluating Government’s Role in Space Commercialization.” 69th International Astronautical Congress (Conference Paper).
- 2018 Balakrishnan, A., Carioscia, S.A., Caldwell, B., Lal, B. “Future of the space situational enterprise.” Advanced Maui Optical and Space Surveillance Technologies Conference (Conference Paper). amotech.com/2018/Balakrishnan
- 2018 Carioscia, S.A., Caldwell, B., Lal, B., Ouellette, S. “STPI holds panel on space traffic management.” IDA Research Insight. www.ida.org/research-insight-9284
- 2017 Lal, B., Carioscia, S.A. “Evaluating options for civil space situational awareness.” Advanced Maui Optical and Space Surveillance Technologies Conference (Conference Paper). amotech.com/2017/Lal

Teaching

COURSE INSTRUCTOR

- 2023 Population Genetics Simulation and Visualization, Johns Hopkins (AS.360.111, Fall)
2023 Modeling Biological Populations, Johns Hopkins (AS.020.313, Intersession)

TEACHING ASSISTANT

- 2023 Quantitative Biology Bootcamp, Johns Hopkins (AS.020.607, Fall)
2021 Quantitative Biology, Johns Hopkins (AS.020.617, Fall)
2021 Developmental Genetics Lab, Johns Hopkins (AS.020.340, Spring)
2020 Developmental Genetics Lab, Johns Hopkins (AS.020.340, Fall)

OTHER INVOLVEMENT

- 2024 Guest Lecturer, Population Genetics Modeling, Johns Hopkins (AS.020.369, Fall)
2023, 2024 Group Facilitator, Teaching Institute, Johns Hopkins Teaching Academy
2023, 2024 Tutor, Quantitative Biology and Biophysics, Johns Hopkins (AS.020.674, Spring)
2023, 2024 Guest Lecturer, Thesis Proposal Preparation, Johns Hopkins (AS.020.619)
2022, 2023 Tutor, Quantitative Biology, Johns Hopkins (AS.020.617, Fall)
2020-2023 [Teaching Certificate Program](#), Johns Hopkins Teaching Academy
2022 Guest Lecturer, Communicating Science, Johns Hopkins (AS.020.619)
2021, 2022 Facilitator, Teaching Assistant Orientation, Johns Hopkins School of Arts and Sciences
2021 Guest Lecturer, Seminar in Biotechnology, University of New Hampshire Manchester
2020-2021 Instructor, [Computational Biology Workshop](#), Agara Bio Community Lab
2014-2020 SAT and ACT Instructor, Capital Educators, Rockville, MD
2014-2017 Tutor, Georgetown University Writing Center

Research mentorship

PHD ROTATION STUDENTS

- 2024 Izabella Mastroianni, NIH-Johns Hopkins University Graduate Partnership Program
2023-2024 Cat Rogers, NIH-Johns Hopkins University Graduate Partnership Program
2022 Jack Dorman, NIH-Johns Hopkins University Graduate Partnership Program
2022 Matthew Isada, Cell, Molecular, Developmental Biology & Biophysics, JHU
2021 Catherine Henderson, Cell, Molecular, Developmental Biology & Biophysics, JHU

UNDERGRADUATE

- 2023- Angela Yang, B.S. in Biology & Computer Science, Johns Hopkins University
* Received the 2024 Provost's Undergraduate Research Award (\$6,000)

Academic, community, & university service

COMMITTEES

2022–	Board Member, Rosslyn Business Improvement District (BID), Arlington, VA * Recognized through the 2024 Community Impact Award
2021–	Board Member, Friends of the Mount Vernon Trail, Arlington, VA
2019–2024	Vice President, Johns Hopkins University Cycling Team
2019–2024	Class of 2017 Alumni Committee, Georgetown University
2018–2019	U.S. Air Force 2030 Science and Technology Strategy Executive Committee
2015–2016	Board Member, Georgetown University Triathlon Team

EDUCATION, VOLUNTEERING, & OUTREACH

2020–2023	First-year Student Mentor, Johns Hopkins Biology Department
2020–2022	symBIOsis Board Member, Johns Hopkins Biology Department
2020–2021	Career Seminars Organizing Committee, Johns Hopkins Biology Department
2018–2021	Volunteer, Georgetown University Career Center
2016–2017	Undergraduate Director, Georgetown University Writing Center
2015–2017	Magis Row Living and Learning Community Leader, Georgetown University

PANELS & PRESENTATIONS

2024	Panelist, National Institutes of Health Graduate School Fair
2024	Presenter, Kindergarten Career Day, Baltimore, MD
2023	Panelist, Personal Narratives, Georgetown University Career Center
2021	Moderator, Careers in Communication, Horizons by Hopkins Conference
2021	Panelist, National Institutes of Health Graduate School Fair
2021	Panelist, How Do I NOT Pay for Graduate School?, Johns Hopkins Life Design Lab
2021	Panelist, Using Twitter in Grad School, Johns Hopkins Graduate Career Services
2020	Session Moderator, Johns Hopkins Department of Biology Retreat
2020	Session Moderator, Space Education and Strategic Applications Conference
2019	Workshop Organizer, Science Policy and Communication Brown Bag Series
2018	Panelist, American Institute of Aeronautics & Astronautics Technical Committee Meeting
2018	Workshop Moderator, White House Office of Science and Technology Policy
2018	Panelist, Using Science in Policy, Arizona State University, Washington, DC
2018	Panelist, Alumni Careers, Georgetown University Writing Center

JOURNAL PEER REVIEW

2022–	Nature Communications, Nature Structural & Molecular Biology
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SOCIETY MEMBERSHIPS

2020–	American Society of Human Genetics (ASHG)
2020–	Association of Women in Science (AWIS)
2019–	Genetics Society of America (GSA)
2019–	Johns Hopkins University Women of Whiting (WOW)
2019–2022	Johns Hopkins Science Policy Group