**MAUREEN A. CAREY, PhD**

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**POSITIONS**

Assistant Professor 2020 – ongoing

Division of Infectious Diseases & International Health, Department of Medicine

University of Virginia School of Medicine, Charlottesville, VA

Co-Director of Data Science 2020 – ongoing

Trans-University Microbiome Initiative

University of Virginia School of Medicine, Charlottesville, VA

Research Fellow 2018 – 2020 Division of Infectious Diseases & International Health, Department of Medicine

University of Virginia School of Medicine, Charlottesville, VA

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**GRANTS AWARDED**

2020 – 2021 Univ. of Virginia’s Trans-University Microbiome Initiative Seed Grant award

PI, budget: $60,000

2019 – 2020 PhRMA Foundation Postdoctoral Fellowship in Translational Medicine & Therapeutics

PI, budget: $90,000

2018 – 2020 Univ. of Virginia’s Engineering-in-Medicine Seed Grant award

Co-I, budget: $80,000

Submitted but not awarded:

NIH F32, submitted 08/2019, impact score: 30

NIH P50, resubmitted 08/2020 (Key Personnel: Lead Scientist, Microbiome Core)

NIH U19, submitted 05/2020 (PI: Director, Bioinformatics Core)

NIH DP2, submitted 11/2020 (PI)

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**PUBLICATIONS**

1. **Carey MA**, Medlock GL, Alam M, Kabir M, Uddin MJ, Nayak U, Papin JA, Faruque ASG, Haque R, Petri WA, Jr., Gilchrist CA (2021). *Megasphaera in the stool microbiota is negatively associated with diarrheal cryptosporidiosis.* Clinical Infectious Diseases. doi: 10.1093/cid/ciab207.
2. **Carey MA**, Dräger A, Beber ME, Papin JA, Yurkovich JT (2020). *Community standards to facilitate development and address challenges in metabolic modeling*. Molecular Systems Biology. doi: 10.15252/msb.20199235.
3. **Carey MA**, Steiner KL, Petri, WA, Jr. (2020). *Ten Simple Rules for reading a scientific paper.* PLOS Computational Biology. doi: 10.1371/journal.pcbi.1008032 \*\*\* *more than 66,000 views*
4. **Carey MA**\*, Untaroiu AM\*%, Guler JL, Papin JA (2019). *Computational predictions of metabolic drug targets in Chloroquine resistant Plasmodium falciparum for combination therapies*. BMC Bioinformatics. doi: 10.1186/s12859-019-2756-y \*co-first authors, % undergraduate mentee
5. Huckaby A, Granum CS, **Carey MA**, Szlachta K, Al-Barghouthi B, Wang Y, Guler JL (2019). *Complex DNA structures trigger copy number variation across the Plasmodium falciparum genome*. Nucleic Acids Research. doi: 10.1093/nar/gky1268
6. Medlock GL, **Carey MA**, McDuffie DG, Giallourou N, Swann JR, Kolling GL, Papin JA (2018). *Inferring metabolic mechanisms of interaction within a defined gut microbiota.* Cell Systems. doi: 10.1016/j.cels. 2018.08.003.
7. **Carey MA\***, Covelli V\*, Brown A, Medlock GL, Harren M, Cooper JG, Papin JA, Guler JL (2018). *Influential parameters for the analysis of intracellular parasite metabolomics*. mSphere. doi: 10.1128/mSphere.00097- 18. \*co-first authors
8. **Carey MA**, Papin JA (2018). *Ten Simple Rules for biologists learning to program*. PLOS Computational Biology. doi: 10.1371/journal.pcbi.1005871. *\*\*\* most downloaded & shared article (2018), most viewed (2019)*
9. **Carey MA**, Papin JA, Guler JL (2017). *Novel Plasmodium falciparum metabolic network reconstruction identifies shifts associated with clinical antimalarial resistance*. BMC Genomics. doi: 10.1186/s12864- 017-3905-1
10. **Carey MA**, Ho ES (2017). *A Transcriptome Study Of Borrelia burgdorferi Infection In Murine Heart And Brain Tissues*. Journal of Young Investigators. doi: 10.22186/jyi.33.1.28-41
11. Higgins MJ, Serrano A, Boateng KY, Parsons VA, Phuong T, Seifert A, Ricca JM, Tucker KC, Eidelman AS, **Carey MA**, Kurt RA (2016). *A multifaceted role for Myd88-dependent signaling in progression of murine mammary carcinoma*. Breast Cancer: Basic and Clinical Research. doi: 10.4137/BCBCR.S40075
12. Burgess SL, Buonomo E, **Carey M**, Cowardin C, Naylor C, Noor Z, Wills-Karp M, Petri WA, Jr. (2014). *Bone Marrow Dendritic Cells from Mice with an Altered Microbiota Provide Interleukin 17A-Dependent Protection against Entamoeba histolytica Colitis*. mBio. doi: 10.1128/mBio.01817-14

**INVITED BOOK REVIEW**

1. Quarterly Review of Biology (*submitted*)

*Computing Skills for Biologists: A Toolbox*, by Stefano Allesina and Madlen Wilmes

**MANUSCRIPTS (UNDER REVIEW)**

1. Ankrah N, Bernstein D, Biggs M, **Carey MA**, Engevik M, García-Jiménez B, Lakshmanan M, Medlock G, Pacheco A, Sulheim S. *Enhancing microbiome research through trustworthy genome-scale metabolic network modeling.* Invited and submitted to *mSystems*.
2. **Carey MA**, Medlock GL, Stolarczyk M, Petri, WA, Jr., Guler JL, Papin JA (2019).*Comparative genomics of parasitic pathogens using genome-scale metabolic modeling.* BioRxiv. doi: 10.1101/772467. Under review at *Cell Systems.*
3. Moutinho MJ, Neubert BC, Jenior ML, **Carey MA**, Medlock GL, Kolling GL, Papin JA (2019). *Functional Anabolic Network Analysis of Human-associated Lactobacillus Strains.* BioRxiv. doi: 10.1101/746420. Reviewed at *mSystems*.

**PRESENTATIONS**

1. Oral: *Comparative analyses of parasites with a comprehensive database of genome-scale metabolic models.* Future of Malaria Research Symposium, Rockville, MD (Nov. 2019)
2. Poster: *The fecal microbiome associated with Cryptosporidium-infection and diarrheal symptoms in Bangladeshi children.* Annual meeting of the American Society for Tropical Medicine & Hygiene, National Harbor, MD (Nov. 2019)
3. Poster: *Debugging parasite genomes: Using metabolic modeling to accelerate antiparasitic drug development.* Advances in *Cryptosporidium* Research Meeting, Grafton, MA (Dec. 2018)
4. Oral: *Debugging parasite genomes: Using metabolic modeling to accelerate antiparasitic drug development*. Biomedical Engineering Society Annual Meeting, Atlanta, GA (Oct. 2018)
5. Poster: *Debugging parasite genomes: Using metabolic modeling to accelerate antiparasitic drug development.* 5th Conference on Constraint-Based Reconstruction & Analysis, Seattle, WA (Oct. 2018)
6. Poster: *Models Constrained with Transcriptomics or Proteomics Data Generate Discordant Predictions.* Biomedical Engineering Society Annual Meeting, Atlanta, GA (Oct. 2018)
7. Poster: *Comparative genomics and network modeling of human parasites.* Molecular Parasitology Meeting, Woods Hole, MA (2018)
8. Poster: *Comparative modeling of human parasites and closely related species.* American Society of Microbiology: Microbe, Atlanta, GA (2018)
9. Poster: *Comparative genomics and modeling of Malaria parasites.* University of Virginia Infectious Disease Day, Charlottesville, VA (2018)
10. Oral: *Debugging the malaria parasite’s genetic code: Comparative genomics of P. falciparum & berghei using metabolic modeling*. Molecular Parasitology Meeting, Woods Hole, MA (2017)
11. Poster: *A metabolic approach for the characterization of antimalarial resistance and the identification of combination therapy targets*. Data-driven Biotechnology: Bench, Bioreactor, and Bedside, Hellerup, Denmark (2017)
12. Oral: *Computational analysis for antimalarial target identification*. Johns Hopkins University Future of Malaria Research Symposium, Rockville, MD (2016)
13. Oral: *A metabolic approach for the characterization of antimalarial resistance and identification of combination therapy targets*. Molecular Parasitology Meeting, Woods Hole, MA (2016)
14. Poster: *Metabolic characterization of artemisinin resistant malaria parasites*. Microbiology Immunology, and Cancer Biology Annual Retreat Poster Session and Cell and Molecular Biology Training Grant Annual Symposium, Charlottesville, VA (2016)
15. Poster: *Explaining resistance with metabolic shifts induced by antimalarials*. Future of Malaria Research Conference, Baltimore, MD (2015)
16. Poster: *Sequencing Bcl6 in Priest Lake Stickleback*. Howard Hughes Medical Institute (HHMI) EXROP Symposium. HHMI, Chevy Chase, MD (2014)
17. Poster: *A Transcriptome Analysis of Borrelia burgdorferi Infected Murine Heart & Brain Tissue*. Penn. Academy of Science Annual Meeting, Susquehanna Univ., Selinsgrove, PA (2014)
18. Poster: *Sequencing Bcl6 in Priest Lake Stickleback*. Summer Research Symposium, University of Texas at Austin, Austin, TX (2013)
19. Poster: *Enhancing HIV-1 Viral Replication Kinetics by Co-Packaging Ribonucleotide Reductase and Thymidine Kinase.* University of Rochester Summer Scholars, Rochester, NY and Summer Research, Lafayette College, Easton, PA (2011)

**TEACHING**

1. Trans-University Microbiome Initiative Weeklong Workshop, Univ. of Virginia (April 2021) \**Recordings and evaluations available*
2. Infectious Diseases and the microbiome lecture, *Biology of Infectious Diseases,* University of Virginia (April 2021) *\*Recordings and evaluations available*
3. Undergraduate journal club leader, University of Virginia (2017, 2019-2020), 2-8 students/semester
4. *Tomorrow’s Professor Today* Program, Univ. of Virginia Center for Teaching Excellence (2019)
5. EuPathDB lecture and tutorial, University of Virginia (July 2017)
6. Intro to computational modeling lecture, *Synthetic Biology*, University of Virginia (Mar. 2017)
7. Tutor, *Calculus (I, II, & III)*, Lafayette College (Aug. 2013 – May 2014)
8. Tutor, *General Biology*, Lafayette College (Aug. 2013 – Dec. 2013)
9. Teaching Assistant: *Modeling Applied to Biology* (Jan. 2013 – May 2013)

**MENTORING** *(all Univ. of Virginia undergraduates unless otherwise noted)*

* 1. Sam Park ‘22 (2021 – current)
  2. Selama Tesfamariam, Howard University ‘24 (2021 – current)
  3. Catalina Alvarez, Biomedical Engineering PhD Student ’25 (2021)
  4. Haritha Guttikonda, M.S., Data Scientist (2020 – 2021)
  5. Isabelle Talicuran ‘22 (2019 – 2021)
  6. Sarah Steenson ’22 (2019 – 2020)
  7. Olufolakemi Olusanya, Howard University ‘21 (2020)
  8. Michał Stolarczyk, M.A. (2017 – 2018)
  9. Ana Untaroiu ‘18 (2015 – 2018)
  10. William Pavlis ’17 (2017)
  11. Andrew Kubiak ’16 (2015 – 2016)
  12. Julius Ha ’15 (2015)

**SERVICE**

1. Reviewer, mSystems, Quarterly Review of Biology, PLOS Computational Biology, Nucleic Acids Research, PLOS Neglected Tropical Diseases, Nature Biotechnology, Scientific Reports, BMC Systems Biology, Journal of Clinical Infectious Diseases (2016 – ongoing)
2. Trans-University Microbiome Initiative group meeting leader, Univ. of Virginia (2020 – ongoing)
3. EngineerGirl Writing Contest Judge, Society of Women Engineers, Univ. of Virginia (2019)
4. Biosafety lab manager, Guler Lab at the Univ. of Virginia (2015 – 2018)
5. Application judge, Univ. of Virginia Undergraduate Summer Research Internship (Mar. 2017)
6. Advisor and judge, Univ. of Virginia High School Global Health Case Competition (Feb. 2017)

**PROFESSIONAL SOCIETIES**

American Society for Tropical Medicine and Hygiene, Graduate Women in Science, Biomedical Engineering Society, American Institute of Chemical Engineers, Society of Biological Engineering, American Society of Microbiology, 2018 – current

**EDUCATION**

*Ph.D.*, Microbiology, Immunology, and Cancer Biology, Univ. of Virginia 2014 – 2018

Dissertation Title: *Debugging parasite genomes: using metabolic modeling to accelerate antimalarial drug development*, doi: 10.18130/V3-XMD4-PZ89

*B.S.,* Biology (Minors in Mathematics and Philosophy), Lafayette College 2010 – 2014

*Cum Laude,* with Honors

**HONORS**

* Nominated for the Most Outstanding Student Award (Univ. of Virginia, 2018 & 2019)
* Invited panelist, Community Standards and Resources, 5th Conference on Constraint-Based Reconstruction and Analysis (Seattle, WA, 2018)
* Univ. of Virginia’s Cell & Molecular Biology Training Grant (5T32GM008136-32, 2015 – 2017)
* Marquis Scholar (Lafayette College, 2010 – 2014)
* Willis Roberts Hunt Biology Award (Lafayette College, 2014)
* Howard Hughes Medical Institute Exceptional Research Opportunities Scholar (2013 – 2014)
* Dean’s List (Lafayette College, 2010 – 2014)
* National Intercollegiate Women’s Fencing Association All-Academic Team (2013 – 2014)
* Silver and Gold Student-Athlete Academic Honor Roll (Lafayette College, 2013 – 2014)
* Tuition Exchange Scholar (Lafayette College, 2010 – 2011)

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**PREVIOUS RESEARCH EXPERIENCE**

1. Honors Thesis, Lafayette College (2013 – 2014), mentor: Eric Ho, Ph.D.

Conducted a transcriptome analysis of *B. burgdorferi*-infected murine heart and brain tissue.

1. Howard Hughes Medical Institute Exceptional Research Opportunities Program (2013), mentor: Daniel Bolnick, Ph.D

Sequenced *Bcl6* gene in two species of stickleback fish; aligned & analyzed sequence results.

1. Intern, International AIDS Society, Geneva, Switzerland (2012), mentor: Ulrike Brizay, Ph.D.

Conducted a literature review on community-based research in the study of HIV/AIDS.

1. NIH Summer Institute of Biostatistics, Boston University (2012), instructor: Lisa Sullivan, Ph.D.

Studied biostatistics & epidemiology, design and analysis of observational studies.

1. Research Assistant, Lafayette College (2012), mentor: Robert Kurt, Ph.D.

Evaluated effects of MyD88 RNAi on protein production, mitotic arrest, and cell death.

1. Summer Scholars Program, University of Rochester (2011), mentor: Baek Kim, Ph.D.

Created a viral vector to enhance HIV-1 transduction efficiency and replication kinetics in terminally differentiated cells by converting the cell’s rNTP pool into dNTP.

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**SKILLS**

* Programming (R, Python, Unix, MATLAB, SAS [limited]), high performance computing (Slurm), version control (Git)
* Computational analytics (data wrangling, statistical & bioinformatic analysis, metabolic network analysis, machine learning)
* Laboratory skills (antibiotic-free *Plasmodium falciparum* culture, *Cryptosporidium* *parvum* invasion assays, BSL2, genetic & biochemical assays)
* Technical writing