

Chelsea M. Crooks

Curriculum Vitae

University of Wisconsin-Madison
AIDS Vaccine Research Laboratory
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I. Background

Education

- 2017-2022 **Doctor of Philosophy**, Microbiology
Microbiology Doctoral Training Program, University of Wisconsin-Madison
Thesis: "Defining factors that influence Zika and dengue virus pathogenic potential", Dr. Thomas C. Friedrich Laboratory
- 2010-2014 **Bachelor of Science**, Microbial, Cellular, and Molecular Biology
Bachelor of Arts, Spanish
Auburn University, Auburn, AL, Magna Cum Laude

Honors, Awards, and Funding

- 2022 Keystone Symposia NK and Irene Cheung Family Scholarship
- 2020 Global Health Institute Graduate Research Award, *UW-Madison*
- 2018-2020 Parasitology and Vector Biology T32 Training Grant Recipient, *UW-Madison*
- 2014 Phi Kappa Phi Honors Society, *Auburn University*
- 2014 University Honors Scholar, *Auburn University*
- 2010-2014 National Merit Scholar Presidential Scholarship, *Auburn University*

II. Research Accomplishments

Peer-reviewed Publications

- Newman, CM*, Ramuta, MD, McLaughlin, MT, Wiseman, RW, Karl, JA, Dudley, DM, Stauss, MR, Maddox, RJ, Weiler, AW, Bliss, MI, Fauser, KN, Haddock, LA, Shortreed, CA, Haj, AK, Accola, MA, Heffron, AS, Bussan, HE, Reynolds, MR, Harwood, OE, Moriarty, RV, Stewart, LM, **Crooks, CM**, Prall, TM, Neumann, EK, Somsen, ED, Burmeister, CB, Hall, KL, Rehrauer, WM, Friedrich, TC, O'Connor, SL, O'Connor, DH. Initial evaluation of a mobile SARS-CoV-2 RT-LAMP testing strategy. *Journal of Biomolecular Techniques*. September 2021. doi: [10.7171/jbt.21-32-03-009](https://doi.org/10.7171/jbt.21-32-03-009)
- Ausderau, K*, Kabakov, S, Razo, E, Mitzey, A, Bach, K, **Crooks, CM**, Dulaney, N, Keding, L, Salas-Quinchucua, C, Medina-Magües, LG, Weiler, AM, Bliss, MI, Eickhoff, J, Simmons, HA, Mejia, A, Antony, KM, Morgan, TK, Capuano, S, Schneider, ML, Friedrich, TC, O'Connor, DH, Golos, TG, Mohr, EL. Neonatal development in prenatally Zika virus-exposed infant macaques with dengue immunity. *viruses*. September 2021. doi: [0.3390/v13091878](https://doi.org/10.3390/v13091878)
- Crooks, CM***, Weiler, AM, Rybarczyk, SL, Bliss, MI, Jaeger, AS, Murphy, ME, Simmons, HA, Mejia, A, Fritsch, MK, Hayes, JM, Eickhoff, JC, Mitzey, AM, Razo, E, Braun, KM, Brown, EA, Yamamoto, K, Shepard, PM, Possell, A, Weaver, K, Antony, KM, Morgan, TK, Newman, CM, Dudley, DM, Peterson, E, Schultz-Darken, N, Katzelnick, LC, Balmaseda, A, Harris, E, O'Connor, DH, Mohr, EL, Golos, TG, Friedrich, TC, Aliota, MT. Prior dengue immunity enhances Zika virus infection of the maternal-fetal interface in rhesus macaques. *PLOS Neglected Tropical Diseases*. July 2021. doi: [10.1371/journal.pntd.0009641](https://doi.org/10.1371/journal.pntd.0009641)
- Bellerose, M*, Clark, A, Youn, JH, Weingarten, RA, **Crooks, CM**, Dekker, JP and Frank, K. Manual Reading of *Sensititre*TM Broth Microdilution System Panels Improves Accuracy of Susceptibility Reporting for Polymyxin Antibiotics. *Journal of Clinical Microbiology*. June 2021. doi: [10.1128/JCM.00332-21](https://doi.org/10.1128/JCM.00332-21)

- Crooks, CM***, Weiler, AM, Rybarczyk, SL, Bliss, MI, Jaeger, AS, Murphy, ME, Simmons, HA, Mejia, A, Fritsch, MK, Hayes, JM, Eickhoff, JC, Mitzey, AM, Razo, E, Braun, KM, Brown, EA, Yamamoto, K, Shepard, PM, Possell, A, Weaver, K, Antony, KM, Morgan, TK, Dudley, DM, Peterson, E, Schultz-Darken, N, O'Connor, DH, Mohr, EL, Golos, TG, Aliota, MT, Friedrich, TC. African-lineage Zika virus replication dynamics and maternal-fetal interface infection in pregnant rhesus macaques. *Journal of Virology*. June 2021. doi: [10.1128/JVI.02220-20](https://doi.org/10.1128/JVI.02220-20)
- Riemersma, KM*, Jaeger, AS, **Crooks, CM**, Braun, KM, Weger-Lucarelli, J, Ebel, GD, Friedrich, TC, Aliota, MA. Rapid evolution of enhanced Zika virus virulence during direct vertebrate transmission chains. *Journal of Virology*. February 2021. doi: [10.1128/JVI.02218-20](https://doi.org/10.1128/JVI.02218-20)
- Moreno, GK*, Braun, KM*, Riemersma, KK*, Martin, MA, Halfmann, PJ, **Crooks, CM**, Prall, T, Baker, D, Baczenas, JJ, Heffron, AS, Ramuta, M, Khubbar, M, Weiler, AM, Accola, MA, Rehauer, WM, O'Connor, SL, Safdar, N, Pepperell, CS, Dasu, T, Bhattacharyya, S, Kawaoka, Y, Koelle, K, O'Connor, DH, Friedrich, TC. Revealing fine-scale spatiotemporal differences in SARS-CoV-2 introduction and spread. *Nature Communications*. November 2020. doi: [10.1038/s41467-020-19346-z](https://doi.org/10.1038/s41467-020-19346-z)
- Breitbach, ME*, Newman, CM*, Dudley, DM*, Stewart, LM, Aliota, MT, Koenig, MR, Shepherd, P, Yamamoto, K, **Crooks, CM**, Young, G, Semler, M, Weiler, A, Barry, G, Heimsath, H, Mohr, E, Eickhoff, J, Newton, W, Peterson, E, Schultz-Darken, N, Permar, S, Dean, H, Capuano, S, Osorio, J, Friedrich, T, O'Connor, DH. Primary infection with dengue or Zika virus does not affect the severity of heterologous secondary infection in macaques. *PLOS Pathogens*. August 2019. doi: [10.1371/journal.ppat.1007766](https://doi.org/10.1371/journal.ppat.1007766)
- Jaeger, AS*, Murreita, RA, Goren, LR, **Crooks, CM**, Moriarty, RV, Weiler, AM, Rybarczyk, SL, Semler, MR, Huffman, C, Mejia, A, Simmons, HA, Fritsch, M, Osorio, JE, O'Connor, SL, Ebel, GD, Friedrich, TC, Aliota, MT. Zika viruses of both African and Asian lineages cause fetal harm in a vertical transmission model. *PLOS Neglected Tropical Diseases*. April 2019. doi: [10.1371/journal.pntd.0007343](https://doi.org/10.1371/journal.pntd.0007343)

Preprint Publications

- Raasch, LE*, Yamamoto, K*, Newman, CM*, Rosinski, JR, Shepherd, PM, Razo, E, **Crooks, CM**, Bliss, MI, Breitbach, ME, Sneed, EL, Weiler, AM, Zeng, X, Noguchi, KN, Morgan, TK, Fuhler, NA, Alberts, AJ, Havlicek, SJ, Mitzey, AM, Antony, KM, Simmons, HA, Eickhoff, JC, Aliota, MT, Mohr, EL, Friedrich, TC, Golos, TG, O'Connor, DH, and Dudley, DM. High dose African lineage Zika virus increases severe adverse fetal outcomes in pregnant rhesus macaques. *bioRxiv*. March 2022. doi: [10.1101/2022.03.21.485088](https://doi.org/10.1101/2022.03.21.485088)

Manuscripts in Preparation

- Braun, KM*, Haddock, LA*, **Crooks, CM**, Barry, GL, Lalli, J, Neumann, G, Watanabe, T, Yoshihiro Kawaoka, Y, Friedrich, TC. Stochastic processes constrain adaptation of wildtype H7N9 avian influenza viruses to mammalian hosts. *In preparation*.

Oral Presentations

- Jun. 2022 (Accepted, conference postponed due to COVID-19) "Comparison of infection dynamics and antibody repertoire in rhesus macaques with serial flavivirus exposures" Keystone Symposia Conference, "Viral Immunity: Basic Mechanisms and Therapeutic Applications," invited speaker, Keystone, CO

- Feb. 2022 “Infection dynamics and antibody repertoire in non-human primates with different flavivirus exposures” Immunology Works in Progress Seminar, University of Wisconsin-Madison, virtual talk
- Feb. 2021 “Why does Zika cause fetal harm? Assessing Zika pathogenesis in a non-human primate model” Microbiology Doctoral Training Program Seminar, University of Wisconsin-Madison, virtual talk
- Nov. 2020 “Prior dengue immunity may enhance Zika virus infection in the placenta of non-human primates” American Society for Tropical Medicine and Hygiene Annual Meeting, invited speaker, virtual talk
- Feb. 2020 “Assessing the impact of virus lineage and immune-status on ZIKV pathogenesis during pregnancy in non-human primates” Parasitology and Vector Biology Training Grant Seminar, University of Wisconsin-Madison
- Nov. 2019 “Why does Zika cause fetal harm? Assessing Zika pathogenesis in a non-human primate model” American Society for Tropical Medicine and Hygiene Annual Meeting, invited speaker, Washington, DC
- Sept. 2019 “Why does Zika cause fetal harm? Assessing Zika pathogenesis in a non-human primate model” Microbiology Doctoral Training Program Seminar, University of Wisconsin-Madison
- Aug. 2019 “If Zika virus has been known to circulate in human populations for almost 70 years, why wasn’t fetal harm observed sooner?” Re-emerging Arboviruses in Global Health Symposium Three Minute Thesis Competition, 3rd Place, University of Wisconsin-Madison
- May 2019 “Why does Zika cause fetal harm? Assessing Zika pathogenesis in a non-human primate model” Parasitology and Vector Biology Training Grant Seminar, University of Wisconsin-Madison
- Oct. 2018 “Assessing the Impact of Prior Dengue Virus Immunity on Zika Virus Pathogenesis During Pregnancy in a Non-Human Primate Model” AIDS Vaccine Research Laboratory Monthly Meeting, University of Wisconsin-Madison

Poster Presentations (Presenting author)

- Jun. 2022 (*Accepted, conference postponed due to COVID-19*) “Comparison of infection dynamics and antibody repertoire in rhesus macaques with serial flavivirus exposures” Keystone Symposia Conference, “Viral Immunity: Basic Mechanisms and Therapeutic Applications,” Keystone, CO
- Oct. 2021 “Impact of serial flavivirus infection on infection dynamics and antibody repertoire in non-human primates” Annual Wisc-e-sota Virology T32 Symposium, Virtual
- Apr. 2020 “Pioneering Real-time, Open Data Sharing During the Zika Virus Outbreak” UW-Madison Day at the Capitol. **Abstract accepted, but presentation cancelled due to COVID-19*
- Nov. 2019 “African-lineage Zika virus causes placental pathology in pregnant macaques” Young Investigator Award Competition, American Society for Tropical Medicine and Hygiene Annual Meeting, Washington, DC
- Sept. 2019 “African-lineage Zika virus causes placental pathology in pregnant macaques” 7th Annual Wisc-e-sota Virology T32 Symposium, University of Wisconsin-Lacrosse
- Aug. 2019 “African-lineage Zika virus causes placental pathology in pregnant macaques” Re-emerging Arboviruses in Global Health Symposium, University of Wisconsin-Madison

- May 2017 “Overcoming Challenges for Antimicrobial Susceptibility Testing”
Post-Baccalaureate Poster Day, National Institutes of Health, Bethesda, MD
- Nov. 2013 “Towards the synthesis of a tripyrromethane derivative mimicking the active site of coenzyme F₄₃₀” Southeastern Regional Meeting of the American Chemical Society, Atlanta, GA

Poster Presentations (Contributing author)

- Oct. 2021 “Cynomolgus macaques are resistant to Spondweni virus infection” Annual Wisconsin Virology T32 Symposium, Virtual
- Oct. 2021 “Characterization of prenatal Zika virus exposure in rhesus macaques via ultrasonography” Midwest Society for Pediatric Research Scientific Meeting, Virtual
- May 2021 “Characterization of macaque decidual T-cells from Zika virus-infected pregnancies” American Society of Reproductive Immunology Annual Meeting, Virtual
- May 2021 “Developmental outcomes of prenatally Zika virus-exposed infant macaques with maternal Dengue virus immunity” Pediatric Academic Societies 2021 Virtual Meeting
- Mar. 2020 “Understanding the role of premembrane protein (prM) in Zika virus pathogenesis” Molecules in the Midwest Conference, Madison, WI
- Nov. 2019 “Developing a robust pregnant rhesus macaque model to test Zika virus treatments and vaccines” Non-human Primate Models for AIDS, San Antonio, TX
- Jun. 2019 “Evaluating the pathogenic potential of African-lineage Zika virus using a nonhuman primate pregnancy model” American Society for Virology Annual Meeting, Minneapolis, MN

Additional Research Experience

- 2017 **Intramural Research Training Award Fellow**, *National Institutes of Health*
Under the direction of Dr. Karen Frank, I evaluated susceptibility testing methods for the polymyxins, a group of last-resort antibiotics used in treating multi-drug resistant infections, to determine an accurate and reproducible test for use in clinical labs.
- 2013-2014 **Undergraduate Research Assistant**, *Auburn University*
In the lab of Dr. Anne Gorden, I conducted research, culminating in an Honors Thesis, focused on synthesizing a simple, small molecule whose biochemical properties mimic those of the coenzyme F₄₃₀ for methane activation studies.

III. Teaching & Mentorship

Classroom

- Spring 2019 **Teaching Practicum**, *Medical Microbiology & Immunology 341: Immunology*
I served as a graduate assistant for MMI 341, in which I provided general support for the class and taught 5 mini-lectures throughout the semester. This undergraduate course serves as an introduction to the immune response to infectious disease.

Mentorship

- 2021-Present **Maria Charles**, undergraduate
Maria is a sophomore undergraduate who joined the lab to gain research experience prior to applying to graduate school. I am leading her training and supervising her work testing new sample processing methods for non-human primate studies.
- 2021-Present **Carson DePatger**, undergraduate
Carson is a senior undergraduate who joined the lab to gain research experience prior to applying to medical school. I am leading her training and co-supervising her work optimizing viral load assays.

- 2021 **Hunter Ries**, rotator
Hunter is a graduate student in the Cellular and Molecular Pathology Program and rotator in the Friedrich lab. I supervised his work to analyze viremia data from serially infected macaques.
- 2021-Present **Livia Romanov**, undergraduate
Livia is a sophomore undergraduate who joined the lab to gain research experience and plans to apply to graduate school. I am leading her research training and supervising her work to characterize viral diversity from longitudinal samples from ZIKV infected macaques.
- 2018-2021 **Elizabeth Brown**, undergraduate
Elizabeth joined the lab to gain research experience and plans to apply to medical school. I led her research training and supervising her work to optimize an assay to isolate and quantify Zika virus RNA from macaque tissue samples and her work to sequence African-lineage Zika virus isolates. Elizabeth was awarded a Sophomore Research Fellowship in April 2019.

IV. Professional Development

Workshops & Outreach Activities

- 2021-present **WISCIENCE Public Service Fellow, Policy & Governance track**, Participating in a year-long professional development fellowship including both academic and practical experience in community engagement with STEM.
- Sept. 2021 **Virtual Catalyzing Advocacy in Science and Engineering Workshop**, AAAS
- 2020-2022 **Microbiology Doctoral Training Program (MDTP) Social Media Committee**, Developed and managed the social media presence for the MDTP program.
- Jun. 2019 **Biology of Vector Borne Disease Training Course, Center for Health in the Human Ecosystem, University of Idaho**, I attended a lecture- and lab-based training course focused on sharing expertise; competency in basic biology; tools and techniques; and, resources for addressing threats from vector-borne diseases of humans, animals, and plants.
- 2018-2020 **Journal Club**, Co-founder, Women and Underrepresented Minorities in Science and Medicine, AIDS Vaccine Research Lab
- 2018 **Member, Catalysts for Science Policy (CaSP)**, University of Wisconsin-Madison
Journal Club Presentation: "Carbon Capture and Storage," March 21, 2018
- August 2018 **Software Carpentry Workshop**, University of Wisconsin-Madison

Media

- Feb. 2020 WKOW27 story – "UW Lab Working to Understand, Slow Virus Outbreak" by Andrew Merica

Professional Society Memberships

- 2019-Present American Society for Tropical Medicine and Hygiene, American Committee on Arthropod-Borne Viruses, Member
- 2018-Present American Society for Virology, Member
- 2017-Present Infectious Disease Society of America, Member

V. Professional Experience

- 2015-2017 **Special Assistant (2016-2017); Confidential Assistant (2015-2016)**
U.S. Department of Health and Human Services, Washington, DC
Served as a political appointee in the Immediate Office of the Secretary as the Special Assistant to the Counselor to the Deputy Secretary of HHS. Responsible for facilitating the activities of cross-departmental teams working on policy initiatives in a broad range of public health, healthcare, and human services programs, including the federal response to the Zika epidemic. *Security clearance: Secret, Level 2.*
- 2015 **Intern, U.S. Department of Health and Human Services, Washington, DC**
Served as an intern in the Office of the Chief of Staff in the Immediate Office of the Secretary. Responsible for communications with senior departmental officials and assisted with the compilation of the Department's weekly memo to the White House.