

Ben Krajacich

POST-DOCTORAL RESEARCHER

Rockville, MD

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Biography

I am a microbiologist, data scientist, and vector ecologist who is broadly interested in diagnostics and infectious disease. My past and current work has largely focused on vector-borne disease and analytics, with my post-bac on tick-borne relapsing fever in soft ticks, my Ph.D on the development of tools to study the use of ivermectin as a malaria control measure in West Africa (Senegal, Liberia, and Burkina Faso), and my post-doc on the dry-season persistence mechanisms of *Anopheles* spp. mosquitoes in Mali. Through my post-doc at the National Institutes of Health I become fluent in the R statistical language; currently use it daily to make maps, dashboards, and perform analyses on diverse datasets. I serve as our research group's point person in navigation of large computational datasets, coding, and general troubleshooting.

Education

Colorado State University

Fort Collins, CO

PH.D. - ADVISOR: DR. BRIAN D. FOY - TOOLS AND TECHNIQUES FOR THE STUDY AND EVALUATION OF MALARIA CONTROL MEASURES IN WEST AFRICA

2011 - 2016

Montana State University

Bozeman, MT

BS - ADVISOR: DR. EDWARD DRATZ - SEEKING A NOVEL SCREEN FOR HUMAN DISEASE: A FOUNDATION FOR CHARACTERIZATION OF ALBUMIN-BOUND LIPIDS AND OTHER COMPOUNDS IN HUMAN BLOOD PLASMA

2005 - 2009

Employment

National Institutes of Health

Rockville, MD

MALARIA RESEARCH PROGRAM POSTDOCTORAL FELLOW - ADVISOR: DR. TOVI LEHMANN - DRY SEASON PERSISTENCE MECHANISMS OF *ANOPHELES COLUZZII* IN MALI

2016 - Present

Colorado State University

Fort Collins, CO

GRADUATE TEACHING ASSISTANT - IMMUNOLOGY LABORATORY, PARASITOLOGY AND VECTOR BIOLOGY

2011 - 2012

National Institutes of Health

Hamilton, MT

POST-BACCALAUREATE IRTA - ADVISOR: DR. TOM SCHWAN - DEVELOPMENT OF A VACCINE CANDIDATE AGAINST THE TICK-BORNE RELAPSING FEVER AGENT *BORRELIA HERMSII*

2009 - 2011

Summary of Skills

- Fluency in R, with extensive experience in data manipulation/wrangling of complex data sets, GIS/mapping, analysis of next-generation sequencing data sets (16S microbiome/RNA-seq/WGS), machine learning, dashboard development for field projects with flexdashboard/Shiny/REDCap, and extraction of weather data for climatic data.
- Extensive wet lab experience including PCR, RT-PCR, QT-NASBA, droplet digital PCR, next-generation sequencing, molecular cloning, generation of expression vectors, and generation of transgenic cell lines, including novel assay development for these approaches. Immunological techniques including western blotting, ELISA, immunohistochemistry, and vaccine production.
- Insect vector husbandry (rearing, maintenance, feeding experiments) including *Ornithodoros* soft ticks, and *Anopheles*, *Culex*, *Aedes* mosquitoes.
- Training and experience in the use and handling of experimental laboratory mice, and a variety of wild animals. Experience in the collection of blood samples through various sites for serological testing.
- Domestic and international field experience including work in French and English-speaking West Africa. Involved entomological surveillance (aspiration catches, human landing catch, CDC light traps, larval collection, tick dragging), taxonomic identification, work with human volunteers, analysis and collection of human blood samples, and involvement in clinical trials (Ivermectin MDA as an anti-malarial endectocide).

Publications and Preprints

- **Krajacich BJ**, Sullivan M, Faiman R, Veru L, Graber L, Lehmann T. Induction of long-lived potential aestivation states in laboratory *An. gambiae* mosquitoes. **Parasites and Vectors**. 13. 412. 2020. doi:<https://doi.org/10.1186/s13071-020-04276-y>
- Sanogo ZL, Dao A, Diallo M, Yossi O, Samake D, **Krajacich BJ**, Faiman R, Lehmann T. The effects of high-altitude windborne migration on survival, oviposition and blood-feeding of the African malaria mosquito, *Anopheles gambiae* s.l. **Journal of Medical Entomology**, tjaa137, <https://doi.org/10.1093/jme/tjaa137>
- Faiman R, Yaro AS, Diallo M, Dao A, Samake D, Sonogo ZL, Sullivan M, Krishna A, **Krajacich BJ**, Lehmann T. Quantifying flight aptitude variation in wild *An. gambiae* s.l. in order to identify long-distance migrants. **Malaria Journal**. 2020. doi:<https://doi.org/10.1101/2020.03.03.975243>
- Florio J, Verú L, Dao A, Yaro AS, Diallo M, Sanogo ZL, Samaké D, Huestis DL, Yossi O, Talamas E, Chomorro L, Frank JH, Biondi M, Morkel C, Bartlett C, Linton Y-M, Strobach E, Chapman JW, Reynolds DR, Faiman R, **Krajacich BJ**, Smith CS, Lehmann T. Massive windborne migration of Sahelian insects: Diversity, seasonality, altitude, and direction. Pre-print. **bioRxiv**. 2020. doi:<https://doi.org/10.1101/2020.02.28.960195>
- Huestis DL, Dao A, Diallo M, Sanogo ZL, Samake D, Yaro AS, Ousman Y, Linton Y-M, Krishna A, Veru L, **Krajacich BJ**, Faiman R, Florio J, Chapman JW, Reynolds DR, Weetman D, Mitchell R, Donnelly MJ, Talamas E, Chamorro L, Strobach E and Lehmann T. Windborne long-distance migration of malaria mosquitoes in the Sahel. **Nature**. 2019. doi:[s41586-019-1622-4](https://doi.org/10.1038/s41586-019-1622-4)
- Faiman R, Dao A, Yaro AS, Diallo M, Djibril S, Sonogo ZL, Ousmane Y, Sullivan M, Veru L, **Krajacich BJ**, Krishna A, Matthews J, France CAM, Hamer G, Hobson KA, Lehmann T. Marking mosquitoes in their natural larval sites using 2H-enriched water: a promising approach for tracking over extended temporal and spatial scales. **Methods in Ecology and Evolution**. 2019. doi:[10.1111/2041-210X.13210](https://doi.org/10.1111/2041-210X.13210)
- **Krajacich BJ**, Huestis DL, Dao A, Yaro AS, Diallo M, Krishna A, Xu J, Lehmann T. Investigation of the Seasonal Microbiome of *Anopheles coluzzii* in Mali. **PLOS ONE**. 2018. 13(3): e0194899
- **Krajacich BJ**, Meyers JI, Alout H, Dabiré KR, Dowell FE, Foy BD. Validation of Near Infrared Spectroscopy for age-grading of wild *Anopheles gambiae*. **Parasites and Vectors**. 2017. 10:552
- Fauver, JR, Grubaugh ND, **Krajacich BJ**, Weger J, Fakoli LS, Bolay F, DiClaro J, Dabiré KR, Foy BD, Brackney D, Ebel GD, Stenglein M. West African *Anopheles gambiae* mosquitoes harbor a taxonomically diverse virome including new insect-specific flaviviruses, mononegaviruses, and totiviruses. **Virology**. 2016. 498:288-299
- **Krajacich BJ**, Lopez JE, Raffel SJ, Schwan TG. (2015). Vaccination with the variable tick protein of the relapsing fever spirochete *Borrelia hermsii* protects mice from infection by tick-bite. **Parasites and Vectors**. 2015;8(546). doi:[10.1186/s13071-015-1170-1](https://doi.org/10.1186/s13071-015-1170-1).
- Grubaugh ND, Sharma S, **Krajacich BJ**, Fakoli LS, Bolay FK, DiClaro JW, Johnson WE, Ebel GD, Foy BD, Brackney DE. (2015). Xenosurveillance: a novel mosquito-based approach for examining the human-pathogen landscape. **PLoS Negl Trop Dis**. 2015;9(3):e0003628. doi:[10.1371/journal.pntd.0003628](https://doi.org/10.1371/journal.pntd.0003628).
- **Krajacich BJ**, Slade JR, Mulligan RF, LaBrecque B, Alout H, Grubaugh ND, Meyers JI, Fakoli LS, Bolay FK, Brackney DE, Burton T A., Seaman J A., DiClaro JW, Dabire RK, Foy BD. (2015). Sampling Host-Seeking Anthropophilic Mosquito Vectors in West Africa: Comparisons of an Active Human-Baited Tent-Trap Against Gold Standard Methods. **Am J Trop Med Hyg**. 2015;92(2):415-421. doi:[10.4269/ajtmh.14-0303](https://doi.org/10.4269/ajtmh.14-0303).
- **Krajacich BJ**, Slade J.R., Mulligan R.F., LaBrecque B., Kobylinski K.C., Gray M., Kuklinski W.S., Burton T.A., Seaman J.A., Sylla M., Foy B.D. (2014). Design and Testing of a Novel, Protective Human-Baited Tent Trap for the Collection of Anthropophilic Disease Vectors. **Journal of Medical Entomology**. 51(1):253-263.
- Lopez J.E., McCoy B.N, **Krajacich BJ**, Schwan T.G. (2011). Acquisition and subsequent transmission of *Borrelia hermsii* by the soft tick, *Ornithodoros hermsi*. **Journal of Medical Entomology**. 48(4):891-895.

Presentations

- **Krajacich BJ**, Dao A, Yaro AS, Diallo M, Samake D, Lamissa Z, Yossi O2, Sullivan M, Faiman R, Lehmann T. Seasonal transcriptional changes of *An. coluzzii* mosquitoes during dry season aestivation. American Society for Tropical Medicine and Hygiene Conference – 2019 – National Harbor, MD – Oral Presentation

- **Krajacich BJ**, Dao A, Yaro AS, Diallo M, Samake D, Lamissa Z, Yossi O2, Sullivan M, Faiman R, Lehmann T. Seasonal transcriptional changes of *An. coluzzii* mosquitoes during dry season aestivation. Malaria Research Day Symposium – 2019 – Rockville, MD – Oral Presentation
- **Krajacich BJ**, Graber L, Faiman R, Sullivan M, Lehmann T. Extension of lifespan in *Anopheles coluzzii* mosquitoes by climatic modulation. American Society for Tropical Medicine and Hygiene Conference – 2018 – New Orleans, LA – Oral Presentation
- **Krajacich BJ**, Huestis DL, Dao A, Yaro AS, Diallo M, Krishna A, Xu J, Lehmann T. Investigation of the seasonal microbiome of *Anopheles coluzzii* mosquitoes in Mali. Genomic Epidemiology of Malaria - 2018 - Hinxton, UK - Oral Presentation
- **Krajacich BJ**, Huestis DL, Dao A, Yaro AS, Diallo M, Krishna A, Xu J, Lehmann T. Investigation of the Seasonal Microbiome of *Anopheles coluzzii* in Mali. Entomological Society of America conference, 2017, Denver, CO.
- **Krajacich BJ**, Meyers J.I., Alout H., Dabiré R.K., Dowell F.E., Foy B.D., Validation of Near Infrared Spectroscopy for the age-grading of wild *Anopheles gambiae*. Oral Presentation at the JHMR's "The Future of Malaria Research" conference 2016, Rockville, MD.
- **Krajacich BJ**, Molina-Cruz A., Barillas-Mury C., Foy, B.D., Use of mosquito bloodmeals as epidemiological tools to study malaria transmission. Oral Presentation at 2016 CVMBS Research Day.
- **Krajacich BJ**, Molina-Cruz A., Grubaugh N.D., Brackney D.E., Alout H., Meyers J.I., Fakoli L.S., Bolay F.K., DiClaro J.W., Dabiré R.K., Barillas-Mury C., Foy, B.D., Development and utilization of molecular methods for the detection of *Plasmodium falciparum* in mosquito bloodmeals. 2015 Keystone Symposia Meeting – The Arthropod Vector: The Controller of Transmission.
- **Krajacich BJ**, Grubaugh ND, Brackney DE, Alout H, Meyers JI, Fakoli LS, Bolay FK, DiClaro JW, Dabiré RK, Foy BD. Detection of *Plasmodium falciparum* in the Bloodmeal of *Anopheles gambiae* using Quantitative Nucleic Acid Sequence Based Amplification (QT-NASBA). American Society for Tropical Medicine and Hygiene 63rd Annual Meeting 2014.
- **Krajacich BJ**, Slade J.R., Mulligan R.F., LaBrecque B., Kobylinski K.C., Gray M., Sylla M., Burton T.A., Kuklinski W.S., Seaman J.A., DiClaro J.W. II, Fakoli L.S. III, Dabiré R.K., Bolay F.K., Foy B.D. Demonstration and Analysis of a Safe, Novel, Human-baited Tent Trap for the Collection of Anthropophagic Disease Vectors. American Society for Tropical Medicine and Hygiene 62nd Annual Meeting 2013.
- **Krajacich BJ**, Slade J.R., Kobylinski K.C., Gray M., Burton T.A., Kuklinski W.S., Seaman J.A., Sylla M., Foy B.D. Demonstration and Analysis of a Safe, Novel, Human-baited Tent Trap for the Collection of Anthropophagic Disease Vectors. 2013 CMB/MCIN/BMB/MIP Spring Poster Symposium.
- **Krajacich BJ**, Bowden J.N., Gillespie, G.D., Dratz, E.A., Seeking a Novel Screen for Disease: Fluorescence Lifetime Monitoring of Plasma Thermal Denaturation. 2008 MSU Student Research Celebration. **Krajacich BJ**, Slade J.R., Kobylinski K.C., Gray M., Burton T.A., Kuklinski W.S., Seaman J.A., Sylla M., Foy B.D. Demonstration and Analysis of a Safe, Novel, Human-baited Tent Trap for the Collection of Anthropophagic Disease Vectors. 2013 CVMBS Research Day.
- **Krajacich BJ**, Bowden J.N., Dratz, E.A., 2009. Seeking a Novel Screen for Human Disease: A Foundation for Characterization of Albumin-Bound Lipids and Other Compounds in Human Blood Plasma. 2009 MSU Student Research Celebration.

Professional Memberships

- American Society for Tropical Medicine and Hygiene (ASTMH) – since 2011
- American Committee of Medical Entomology (ACME) – since 2011

Community Outreach and Service

- **Journal Referee**, Parasites and Vectors, Nature: Scientific Reports, Nature Communications, Malaria Journal, PeerJ, PLOS Biology, PLOS ONE
- **Guest Community Scientist**, HB Woodlawn Secondary Program, Arlington, VA

- **Supervision**, trained and advised students in molecular biology/ wet lab techniques, survival analysis, and work in R.

Awards and Grants

- Summer 2018 – Awarded Travel Bursary to attend Wellcome Trust / Sanger Institute Genomic Epidemiology of Malaria conference in Hinxton, UK
- Supplemental Funding Request – FY2017 – National Institutes of Health - “Acquisition of the Thermo-Scientific KingFisher Flex Robot for High throughput DNA/RNA extraction” - \$55,312.50
- Fall 2016-Fall 2019 – Awarded Malaria Research Program Postdoctoral Fellowship
- Fall 2014 – Department of Microbiology, Immunology, and Pathology Travel Grant to attend the American Society for Tropical Medicine and Hygiene annual meeting.
- Fall 2009 – Recipient of National Institutes of Health Post-Baccalaureate Intramural Research Training Award
- Fall 2008 – IdeA Network for Biomedical Research Excellence (INBRE) Program Grant
- Summer 2008 – Montana State University’s University Scholar’s Program Funding Grant
- Spring 2008 – IdeA Network for Biomedical Research Excellence (INBRE) Program Grant