

1. PERSONAL DATA

Place of Birth: Birmingham, Alabama

2. EDUCATION

08/1998-05/2002 BA, Latin and Mathematics, Marshall University, Huntington, WV
08/2002-05/2006 MA, Mathematics, Marshall University, Huntington, WV
08/2006-05/2010 MD, Joan C Edwards Marshall University School of Medicine, Huntington, WV

3. POSTGRADUATE TRAINING

07/2010-06/2013 Resident in Internal Medicine, University of Wisconsin, Madison, WI
07/2014-06/2017 Fellow in Infectious Diseases, University of Washington, Seattle, WA

4. FACULTY POSITIONS HELD

07/2017- Research Associate, Fred Hutchinson Cancer Research Center, Seattle, WA
07/2017- Acting Instructor, Division of Infectious Diseases, University of Washington, Seattle, WA

5. HOSPITAL POSITIONS HELD

07/2013-06/2014 Staff Physician, William S Middleton Memorial VA Hospital, Madison, WI
07/2017- Attending Physician, Seattle Cancer Care Alliance, University of Washington Medical Center, Harborview Medical Center, Seattle, WA

6. HONORS

2006 Anagene B. Heiner Memorial Basic Science Poster Presentation Award, Marshall University SOM, Research Day
2012 David Sundee Humanism in Medicine Award, Internal Medicine Residency, University of Wisconsin
2012 Winner Oral Research Presentation Competition, Wisconsin State ACP Meeting
2013 Winner of Research Poster Competition, University of Wisconsin, Internal Medicine Research Day
2016 Winner of Poster Competition, Conference for Gene and Cell Therapy for HIV Cure, Seattle, WA
2016 IDSA Travel Award, New Orleans, LA
2016 Office of Post-doctoral Affairs Travel Scholarship, University of Washington
2017 Scholarship Award, Summer Institute in Statistics and Modeling in Infectious Diseases (SISMID)
2018 Best Abstract Award, BMT Tandem Meetings 2018

7. BOARD CERTIFICATION

2013 Diplomate, American Board of Internal Medicine
2016 Diplomate, American Board of Internal Medicine, Infectious Diseases

8. LICENSURE

- 2011-2014 Wisconsin State Medical License
- 2014- Washington State Medical License

9. PROFESSIONAL ORGANIZATIONS

- 2010-2014 American College of Physicians
- 2014- Infectious Diseases Society of America
- 2018- American Society for Blood and Marrow Transplantation

10. TEACHING RESPONSIBILITIES

A. Courses

- 2002-2005 College Algebra for Business Majors, Marshall University, Full Responsibility
- 2003 Trigonometry, Marshall University, Full Responsibility
- 2005 Business Calculus, Marshall University, Full Responsibility
- 2002-2003 Building English Vocabulary from Greek and Latin Elements, Marshall University, Full Responsibility

B. Clinical Teaching

- 2013-2014 Internal Medicine, VA Hospital, Madison, WI
- 2017- Seattle Cancer Care Alliance Infectious Diseases (inpatient consultations), University of Washington Medical Center, Seattle, WA
- 2017- Madison Clinic (HIV outpatient/primary care), Harborview Medical Center, Seattle, WA

C. Invited talks

- 2013 "Listeriosis as a possible complication of Fecal Microbiota Transplant," Frontiers in Gastroenterology and Hepatology, University of Washington
- 2015- "Rickettsial Diseases," Infectious Disease Fellows Board Review, University of Washington
- 2016- "Antiretroviral Therapy Basics," Infectious Disease Fellows Board Review, University of Washington
- 2016 "A compound interest approach to HIV cure," University of Wisconsin and Midwest AIDS Training and Education Center, Madison, WI
- 2017- "Inpatient and Outpatient Infectious Disease Consultations using ORCA and EPIC," Infectious Disease Fellows Orientation Workshop, University of Washington
- 2017 "Cytomegalovirus kinetics after hematopoietic cell transplant," Mixed Chimerism Investigators' Meeting, Fred Hutchinson Cancer Research Center, Seattle, WA
- 2018 "Viral Kinetic Correlates of CMV Disease and Death after Hematopoietic Cell Transplant," University of Washington Virology and Fred Hutch Infectious Disease Sciences Symposium, Seattle, WA
- 2019 "Viral Load Kinetics as Surrogates for CMV Clinical Outcomes after HCT," Allergy and Infectious Diseases Division Retreat, University of Washington, Seattle, WA

11. SPECIAL LOCAL RESPONSIBILITIES

- 2011-2012 Hand Hygiene Committee, University of Wisconsin Hospitals and Clinics
- 2018 Planning Committee for the University of Washington Virology and Infectious Disease Sciences Symposium
- 2020- SCCA Infectious Diseases EPIC SuperUser and Member of UWMC

2020 Infectious Disease Group EPIC Implementation Committee
Clinical lead on establishing SCCA patient COVID-19 drive-through testing

12. RESEARCH FUNDING

A. Current

N/A

B. Past

2017-2020 Sponsor: NIH/NCATS
Title: Optimizing Anti-viral Treatment for Cytomegalovirus Infection following Hematopoietic Cell Transplant
KL2 TR002317, Institute of Translational Health Sciences, University of Washington
Total Costs: \$437,841
Role: Principal Investigator

2019-2020 Sponsor: Center for Clinical and Translational Research Pediatric Pilot Funds at Seattle Children's Hospital
Title: Association of BK virus and kidney injury in the hematopoietic cell transplant population
Total Costs: \$20,000
Role: Co-Investigator

2015-2017 Sponsor: NIH/NIAID
Title: Host Defense Training in Allergy and Infectious Diseases
T32 AI 0070-44, Van Voorhis (PI), University of Washington
Goal: Salary support for training of academicians in Infectious Diseases, Allergy, and Geographic Medicine, with emphasis on research training
Total Costs: \$2,522,670
Role: Fellow/Trainee

13. BIBLIOGRAPHY

A. Publications in Refereed Journals

1. Keller BR, **Duke ER**, Amer AS, Zill SN (2007) Tuning posture to body load: decreases in load produce discrete sensory signals in the legs of freely standing cockroaches. *J Comp Physiol A* 93:881-891. PMID: 17541783 [original work]
2. Zill SN, Keller BR, **Duke ER** (2009) Sensory signals of unloading in one leg follow stance onset in another leg: Transfer of load and emergent coordination in cockroach walking. *J Neurophysiol* 101:2297-2304. PMID: 19261716 [original work]
3. Zill SN, Keller BR, Chaudry S, **Duke ER**, Neff D, Quinn R, Flannigan C (2010) Detecting substrate engagement: responses of campaniform sensilla in cockroaches. *J Comp Physiol A Neuroethol Sens Neural Behav Physiol* 196:407-420. PMID: 20396892 [original work]
4. **Duke ER**, Reeves DB, Prlc M, Hladik F, Schiffer JT (2017) Anti-proliferative therapy for HIV cure: a compound interest approach to HIV cure. *Sci Rep* 7:4011. PMID: 28638104 [original work]
5. Murphy SC, **Duke ER**, Shipman KJ, Jensen RL, Fong Y, Ferguson S, et al. (2018) A randomized trial of prophylactic activity of DSM265 against pre-erythrocytic *Plasmodium falciparum* controlled human malaria infection by

- mosquito bites and direct venous inoculation. *J Inf Dis* 217:693-702. PMID: 29216395 [original work]
6. Reeves DB, **Duke ER**, Wagner TW, Palmer SE, Spivak AM, Schiffer JT (2018) A majority of HIV persistence during antiretroviral therapy is due to infected cell proliferation. *Nat Commun* 16:4811. PMID: 30446650 [original work]
 7. McGuffin SA, Bharadwaj R, Gonzalez-Cuyar LF, Schiffer JT, Stacey AW, Walter RB, **Duke ER** (2019) In the eye of the beholder: a conjunctival lesion in a woman with acute myelogenous leukemia. *Clin Infect Dis* 18:525-529. PMID: 30657904 [case report]
 8. Imlay H, Xie H, Leisenring W, **Duke ER**, Kimball L, Huang M, Pergam S, Hill J, Jerome K, Milano F, Nichols G, Pang P, Hirsch H, Limaye A, Boeckh M (2020) Presentation and Outcome of BK Polyomavirus-associated Hemorrhagic Cystitis after Hematopoietic Cell Transplantation. *Blood Advances* 4:617-628. PMID: 32074279 [original work]
 9. Reeves DB, Huang Y, **Duke ER**, Mayer B, Cardozo-Ojeda F, Boshier F, Swan D, Rolland M, Robb M, Mascola J, Cohen M, Corey L, Gilbert P, Schiffer JT (2020) Mathematical Modeling to Reveal Breakthrough Mechanisms in the HIV Antibody Mediated Prevention (AMP) Trials. *PLOS Comput Biol* 16(2):e1007626. PMID: 32084132 [original work]
 10. Roychoudhury P, Swan DA, **Duke ER**, Corey L, Zhu J, Dave VA, Spuhler LR, Lund J, Pric M, Schiffer JT (2020) HSV-2 infected cell elimination is mediated predominantly by paracrine effects of tissue-resident T-cells. *J Clin Invest* pii: 132583 PMID: 32125285 [original work]
 11. Beigel JH, Tomashek KM, Dodd LE, Mehta AK, Zingman BS, Kalil AC, Hohmann E, Chu HY et al. and the **ACTT-1 Study Group**. Remdesivir for the Treatment of Covid-19-Preliminary Report. *NEJM* PMID: 32445440

B. Book Chapters

1. **Duke ER**, Boeckh M, Geballe AP (2020). Cytomegalovirus, In: *Encyclopedia of Gastroenterology 2nd Edition*, vol 1, pages 807-814. Ed Ernst Kuipers. Oxford: Academic Press [Review]

C. Published Books, Videos, Software, etc.

1. **Duke ER** (2002) *Translating Martial—Latin translations, theory, and student guide*. <http://eduke.org/martial> [original work]
2. **Duke ER** (2006) *Solving Higher Order Dynamic Equations on Time Scales as First Order Systems*. Theses, Dissertations and Capstones. Paper 577. <http://mds.marshall.edu/etd/577> [original work]

D. Other Publications

1. **Duke ER**, Hall KJ, and Oberste-Vorth RW (2004) Changing time scales I: The continuous case as a limit. *Proceedings of the Sixth WSEAS Intl Conf on Applied Mathematics*, Poulos, Mastorakis, Mladenov, Gorla. [Published in Conference Proceedings] [original work]
2. **Duke ER**, Hall KJ, and Oberste-Vorth RW (2004) Changing time scales II: Bifurcations in second degree equations. *Proceedings of the Sixth WSEAS Intl Conf on Applied Mathematics*, Poulos, Mastorakis, Mladenov, Gorla. [Published in Conference Proceedings] [original work]
3. Cardozo Ojeda EF, **Duke ER**, Peterson CW, Reeves DB, Mayer BT, Kiem HP, Schiffer JT (2019) Thresholds for post-rebound SHIV control after CCR5 gene-

- edited autologous hematopoietic cell transplantation. bioRxiv doi:10.1101/629717 [original work]
4. Boshier FAT, Reeves DB, **Duke ER**, Swan DA, Prlic M, Cardozo-Ojeda EF, Schiffer JT (2020) Blind Uneven Proliferation of CD4+ T cells During Primary Infection Generates the Majority of the HIV Reservoir. medRxiv doi:10.1101/2020.04.06.20053231
 5. Waghmare A, Krantz EM, Baral S, Vasquez E, Loeffelholz, Chung EL, Pandey U, Kuypers J, **Duke ER**, Jerome KR, Greninger AL, Reeves DB, Hladik F, Cardozo-Ojeda EF, Boeckh M, Schiffer JT (2020) Reliability of self-sampling for accurate assessment of respiratory virus viral and immunologic kinetics. medRxiv doi: 10.1101/2020.04.03.20051706 [original work]
 6. Goyal A, **Duke ER**, Cardozo-Ojeda EF, Schiffer JT (2020) Mathematical modeling explains differential SARS-CoV2 kinetics in lung and nasal passages in remdesivir treated rhesus macaques. bioRxiv doi:10.1101/2020.06.21.163550 [original work]

E. Manuscripts Submitted

1. **Duke ER**, Williamson BD, Borate B, Golob JL, Stevens-Ayers T, Huang M, Cossrow N, Wan H, Mast TC, Marks MA, Flowers ME, Jerome KR, Corey L, Gilbert PB, Schiffer JT, Boeckh MJ (2019) CMV viral load kinetics as surrogates – evidence from a randomized trial. J Clin Invest [original work] *In review*
2. Cardozo-Ojeda EF, **Duke ER**, Peterson CW, Reeves DB, Mayer BT, Kiem HP, Schiffer JT (2020) Thresholds for post-rebound SHIV control after CCR5 gene-edited autologous hematopoietic cell transplantation. eLife [original work] *In review*
3. Kublin J, Murphy SC, Maenza J, Seilie AM, Jain JP, Goswami B, Berger D, Spera D, Stein D, Zhao R, Hackling M, Soon RL, Czartoski JL, Potochnic MA, **Duke ER**, Chang M, Vaughan A, Kappe SHI, Leong FJ, Pertel P, Prince WT (2020) Safety, pharmacokinetics and causal prophylactic efficacy of KAF156 in a Plasmodium falciparum human infection study. Clin Infect Dis [original work] *In review*
4. Waghmare A, Krantz EM, Baral S, Vasquez E, Loeffelholz T, Chung EL, Pandey U, Kuypers J, **Duke ER**, Jerome KR, Greninger AL, Reeves DB, Hladik F, Cardozo-Ojeda EF, Boeckh M, Schiffer JT (2020) Reliability of self-sampling for accurate assessment of respiratory virus viral and immunologic kinetics. J Infect Dis [original work] *In review*
5. Boshier FAT, Reeves DB, **Duke ER**, Swan DA, Prlic M, Cardozo-Ojeda EF, Schiffer JT (2020) Blind Uneven Proliferation of CD4+ T cells During Primary Infection Generates the Majority of the HIV Reservoir. Nat Commun [original work] *In review*
6. Goyal A, **Duke ER**, Cardozo-Ojeda EF, Schiffer JT (2020) Mathematical modeling explains differential SARS-CoV2 kinetics in lung and nasal passages in remdesivir treated rhesus macaques. Nat Commun [original work] *In submission*

F. Abstracts

1. Zill SN, **Duke ER** and Keller BR (2006) Discrete sensory signals of load decreases in the legs of freely moving cockroaches. Society for Neuroscience Abstracts 32, program no. 449.9. [original work]

2. Zill SN, **Duke ER**, Keller BR, Holliday C and Rhoten WC (2007) Teaching medical gross anatomy with prosections and digital images: advantages and disadvantages. *FASEB Journal* 21(6):lb2. [original work]
3. Keller BR, Neff D, **Duke ER**, Amer AS and Zill SN (2007) Detecting load in pedal extremities: structure and responses of sense organs that encode forces in the tarsi of cockroaches. *Society for Neuroscience Abstracts* 33, program no. 78.2. [original work]
4. Keller BR, Neff D, **Duke ER**, and Zill SN (2008) Force feedback from cockroach campaniform sensilla depends upon receptor location: signals of unloading from tibial receptors can aid in 'emergent' coordination in walking, tarsal receptors encode muscle contractions in substrate grip. *Society for Neuroscience Abstracts* 34, program no. 375.26. [original work]
5. **Duke ER**, Reeves DB, Prilic M, Hladik F, and Schiffer JT (2016) A compound interest approach to HIV cure. *Keystone HIV Persistence: Pathogenesis and Eradication (X7)*, Abstract 4011. [original work]
6. Reeves DB, **Duke ER**, Spivak AM, and Schiffer JT (2016) Latent Cell Proliferation Sustains the HIV Reservoir on Long-term ART—A Mathematical Modeling Study with Implications for Cure. *IDWeek*, Abstract 58639. [original work]
7. **Duke ER**, Reeves DB, Prilic M, Hladik F, and Schiffer JT (2016) Estimates of achieving HIV cure with anti-proliferative therapy. *HIV/AIDS Research: Its History and Future*, Cold Spring Harbor Laboratory, <http://library.cshl.edu/Meetings/HIV-AIDS/abstract.php> [original work]
8. Murphy SC, **Duke ER**, Jensen R, Fong Y, Fritzen E, VonGoedert T, et al. (2016) A proof-of-concept, randomized study in non-immune healthy adult volunteers to investigate the safety, tolerability, pharmacokinetic profile and prophylactic activity of a single dose of DSM265 in a controlled human malarial infection challenge either by direct venous inoculation of *Plasmodium falciparum* sporozoites of a single episode of bites by mosquitoes carrying *P. falciparum*. *American Society of Tropical Medicine & Hygiene*, Abstract 1534. [original work]
9. Reeves DB, **Duke ER**, Spivak AM, and Schiffer JT (2017) Stochastic simulations show that long-term antiretroviral therapy shifts the mechanism of HIV persistence toward proliferating latently infected cells. *Keystone Symposia on Molecular and Cellular Biology: Modeling Viral Infections and Immunity (E1)*, Estes Park, Colorado. [original work]
10. Murphy SC, **Duke ER**, Shipman KJ, Jensen RL, Fong Y, Ferguson S, et al. (2017) Prophylactic activity of DSM265 against pre-erythrocytic *Plasmodium falciparum* controlled human malaria infection by mosquito bites and direct venous injection. *American Society of Tropical Medicine & Hygiene*, Abstract 11. [original work]
11. **Duke ER**, Gilbert PB, Stevens-Ayers TL, Golob JL, Cossrow N, Marks MA, et al. (2018) Viral Kinetic Correlates of Cytomegalovirus Disease and Death after Hematopoietic Cell Transplant. *BMT Tandem Meetings*, Salt Lake City, UT, Abstract 1. [original work]
12. Reeves DB, **Duke ER**, Huang Y, Gilbert P, Schiffer JT (2018) Viral dynamics model illustrates diverse outcomes in simulated AMP trials. *Keystone Symposia J6: Progress and Pathways Toward an Effective HIV Vaccine*, Banff, Alberta. [original work]
13. Cardozo Ojeda EF, **Duke ER**, Peterson CW, Kiem HP, Schiffer JT (2018) Sequential cART Interruptions after CCR5-modified Stem Cell Transplantation

- May Induce a SHIV Functional Cure. Strategies for an HIV Cure, NIH, Bethesda, MD. [original work]
14. **Duke ER**, Williamson BW, Stevens-Ayers TL, Cossrow N, Marks MA, Wan H, et al. (2018) Determination of Optimal Viral Kinetic Markers for Predicting Antiviral Treatment Effect for the Prevention of Cytomegalovirus Disease after Hematopoietic Cell Transplant Using Machine Learning and a Novel Non-Parametric Estimation Method. Transplantation and Cellular Therapy Meetings of ASBMT and CIBMTR, Houston, TX. [original work]
 15. **Duke ER**, Boeckh MJ, Schiffer JT, Cardozo-Ojeda EF (2019) Mathematical Modeling of Cytomegalovirus following Hematopoietic Cell Transplantation Reproduces Viral Dynamics and Demonstrates Importance of Immune Control. 7th International Congenital CMV Conference and the 17th International CMV Conference, Birmingham, AL, Abstract 146. [original work]
 16. Cardozo Ojeda EF, **Duke ER**, Peterson CW, Kiem HP, Schiffer JT (2019) Mathematical Modeling of SHIV Post-rebound Control after Autologous Hematopoietic Stem/Progenitor Cell Transplantation with CCR5 Gene-edited Cells. Keystone Symposia X8: Functional Cures and Eradication of HIV, Whistler, British Columbia, Poster 1029. [original work]
 17. **Duke ER**, Tettamanti Boshier F, Mayer BT, Boeckh M, Schiffer JT (2019) Mathematical Modeling of Untreated Cytomegalovirus Infection following Hematopoietic Cell Transplantation Reproduces Viral Dynamics and Demonstrates the Importance of a Dynamic Immune Response. 4th Workshop on Viral Dynamics, Paris, France. [original work]
 18. Boshier FAT, Reeves D, **Duke ER**, Swan D, Cardozo-Ojeda EF, Schiffer JT (2019) Blind Homeostatic Proliferation During Primary HIV Infection May Contribute to the Formation of the HIV Reservoir, 4th Workshop on Viral Dynamics, Paris, France. [original work]
 19. Cardozo F, **Duke ER**, Peterson C, Reeves D, Mayer B, Kiem HP, Schiffer J (2019) Conditions for post-rebound SHIV control in autologous hematopoietic-stem cell transplantation. 9th International Workshop on HIV Persistence During Therapy, Miami, FL, Abstract 00206. [original work]
 20. **Duke ER**, Williamson BD, Wychera C, Cossrow N, Marks MA, Wan H, et al. (2020) CMV Viral Load Kinetics as Surrogate Endpoints for Antiviral Prophylaxis Trials. Transplantation and Cellular Therapy Meetings of ASBMT and CIBMTR, Orlando, FL, Abstract 501. [original work]
 21. Wychera C, **Duke ER**, Imlay H, Xie H, Leisenring W, Nichols G, et al. (2020) BK Viremia Was Not Associated with Acute Kidney Injury in Hematopoietic Cell Transplant Recipients, Transplantation and Cellular Therapy Meetings of ASBMT and CIBMTR, Orlando, FL, Abstract 496. [original work]
 22. Wychera CM, **Duke ER**, Faino A, Imlay H, Scott BK, Boeckh M, et al. (2020) Association of BK viremia with chronic kidney disease in pediatric hematopoietic cell transplant recipients, Pediatric Academic Societies Meeting, Philadelphia, PA, Abstract 43. [original work]

14. OTHER

A. Manuscript Review

1. Journal of Medical Virology (1)
2. Biology of Blood and Marrow Transplantation (2)
3. Blood (2)
4. Blood Advances (1)

B. Sub-investigator for clinical trials

1. DSM 265
2. KAF 156
3. Pritelivir
4. Dried blood spot
5. Late-phase letermovir
6. Remdesivir