

## Cindy M. Liu, M.D., M.P.H., Ph.D.

### HOME

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### OFFICE

Department of Environmental and Occupational Health  
George Washington University  
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### EDUCATION AND TRAINING

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- 2015 Johns Hopkins School of Medicine, Baltimore, MD  
*Residency in Clinical Pathology*
- 2013 Northern Arizona University, Department of Biology, Flagstaff, AZ  
*Doctor of Philosophy in Biology* (Advisor: Paul S. Keim, Ph.D.).
- 2007 New York University, School of Medicine, New York, NY  
*Doctor of Medicine*
- 2006 The Johns Hopkins University, Bloomberg School of Public Health, Baltimore, MD  
*Masters in Public Health in Epidemiology/Biostatistics Methods in Public Health and Clinical Research*. Note: this degree was earned between 3<sup>rd</sup> and 4<sup>th</sup> years of medical school.
- 2002 The Johns Hopkins University, School of Arts and Sciences, Baltimore, MD  
*Bachelor of Arts in International Studies with International Health Concentration*

### PROFESSIONAL EMPLOYMENT

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- 07/15-Current George Washington University, Department of Environmental and Occupational Health, Washington, DC  
*Assistant Research Professor*
- 07/15-Current George Washington University, Antibiotic Resistance Action Center, Washington, DC  
*Chief Medical Officer*
- 07/15-Current Johns Hopkins University, Department of Medicine, Division of Infectious Diseases, Baltimore, MD  
*Adjunct Assistant Professor*
- 07/15-10/17 MiLAB Project (a JHU-IMEC research collaborative)  
*Immunoassay Team Lead*
- 07/13-06/15 Johns Hopkins University, Department of Pathology, Baltimore, MD  
*Resident*
- 07/12-06/13 Johns Hopkins University, Department of Pathology, Baltimore, MD  
*Intern*
- 02/09-05/12 Northern Arizona University, Center for Microbial Genetics and Genomics, Flagstaff, AZ  
*Research Associate* (Advisor: Paul S. Keim, Ph.D.)

02/09-05/12	Translational Genomics Research Institute (TGen), Flagstaff, AZ <i>Adjunct Associate Investigator</i>
06/07-02/09	Translational Genomics Research Institute (TGen), Division of Pathogen Genomics, Flagstaff, AZ <i>Post-Doctoral Fellowship</i> (Advisor: Paul S. Keim, Ph.D.)

## MEDICAL LICENSURE

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Maryland License No. D0078893

## BOARD CERTIFICATION

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*Clinical Pathology*, American Board of Pathology 07/28/15-07/27/25

## HONORS & DISTINCTIONS

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### **Honors**

2002	<i>Graduated with Departmental Honors in International Studies with honors thesis, "Schooling for rural Chinese women and girls as a viable solution for China's population issues and gender inequalities"</i>
2002	<i>Graduated with General Honors</i>
2001	<i>AEΔ Pre-medical Honor Society</i>
2001	<i>International Studies Honor Society</i>
1999-2002	<i>Dean's List</i> (4 semesters)

### **Awards**

2016	<i>ICAAC Young Investigator Award</i> – American Society for Microbiology
2016	<i>Extramural Loan Repayment Program, Clinical Research</i> – NIH/NIAID
2013	<i>Young Investigator Award</i> – Conference on Retroviruses and Opportunistic Infections (CROI)
2011	<i>Lindau Nobel Laureate Meeting, United States representative</i>
2010	<i>Philanthropic Education Organization Scholar Award</i>
2001	<i>The Johns Hopkins Goodman Award</i>

## FUNDING

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Pending	NIH/AHRQ R01 HS026233 <i>Improving Stewardship in Urgent Care: Messaging for Behavior Change</i> • Principal Investigator	06/01/18-05/31/23
Current	NIH/NIAID R01 AI28779A <i>Penile microbiome, inflammation and HIV susceptibility during sexual debut and maturation among male adolescents</i> • Co-Investigator	02/01/17-01/31/21
Current	Bill & Melinda Gates Foundation <i>Evaluation of the ShangRing vs. Mogen Clamp for Early Infant Male Circumcision in sub-Saharan Africa</i>	01/01/17-12/31/18

	<ul style="list-style-type: none"> <li>• Co-Investigator</li> </ul>	
Current	National Health and Medical Research Council, Australia <i>Resolving Human Immunodeficiency Virus (HIV) transmission</i>	01/01/17-12/31/19
	<ul style="list-style-type: none"> <li>• Co-Investigator</li> </ul>	
Current	Merck Global Population Health Division <i>Promoting Better Antibiotic Stewardship in Urgent Care Medicine</i>	01/01/17-12/31/17
	<ul style="list-style-type: none"> <li>• Co-Investigator</li> </ul>	
Current	NIH/NIAID R01 AI123002-01 <i>The role of penile bacteria and inflammation in HIV susceptibility: Rakai, Uganda</i>	07/01/16-06/30/21
	<ul style="list-style-type: none"> <li>• Co-Investigator</li> </ul>	
Current	NIH/NIAID R01 AI125562-01 <i>The dynamics of nasal bacterial ecology and S. aureus antagonism</i>	07/01/16-06/30/21
	<ul style="list-style-type: none"> <li>• Co-Investigator</li> </ul>	
Current	NIH/NIAID/NICHD R21 AI123840-01 <i>Modeling Staphylococcus aureus antagonism in pediatric nasal bacterial communities</i>	04/01/16-03/31/18
	<ul style="list-style-type: none"> <li>• Principal Investigator</li> </ul>	
Current	Canadian Institute of Health Research <i>Understanding mucosal protection against HIV: delineating interactions between the immune system, microbiome and mucus</i>	10/01/15-09/30/20
	<ul style="list-style-type: none"> <li>• Co-Investigator</li> </ul>	
Completed	National Science Foundation Innovative Corps Teams Program <i>Improving care, decreasing cost, and preserving antibiotics through rapid diagnostics</i>	01/01/16-03/01/17
	<ul style="list-style-type: none"> <li>• Co-PI</li> </ul>	
Completed	Canadian Institute of Health Research MOP-115020 <i>Defining the clinical and immune causes of disproportionately high HIV levels in semen</i>	10/01/11-09/30/15
	<ul style="list-style-type: none"> <li>• Co-Investigator</li> </ul>	
Completed	NIH/NIAID/NIDCR R15 DE021194-01 <i>Microbial ecology in the Chronic Rhinosinusitis Microbiome</i>	09/01/10-08/31/14
	<ul style="list-style-type: none"> <li>• Principle Investigator (transferred to Jeff Foster, Ph.D. prior to residency)</li> </ul>	
Completed	NIH/NIAID R01 AI087409-01A1 <i>Genital Anaerobes, Inflammation and HIV Risk; Rakai</i>	07/01/10-06/30/14
	<ul style="list-style-type: none"> <li>• Collaborator</li> </ul>	
Completed	TGen 2008 Sylvia Chase Post-Doctoral Fellowship Grant <i>Microbiome of the human paranasal sinus: a pilot study on the microbial communities in the healthy and Chronic Rhinosinusitis maxillary sinus.</i>	06/1/08-05/31/09
	<ul style="list-style-type: none"> <li>• Principle Investigator</li> </ul>	

## **PUBLICATIONS BY RESEARCH AREA**

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### ***Peer-reviewed Human Microbiome Manuscripts***

1. **Liu CM**, Prodger JL, Tobian AAR, Abraham A, Kigozi G, Hungate BA, Aziz M, Nalugoda F, Sariya S, Serwadda D, Kaul R, Gray RH, Price LB. Penile anaerobic dysbiosis: a novel risk factor for HIV infection. *mBio* 2017 Jul 25;8(4). pii: e00996-17. doi: 10.1128/mBio.00996-17.
2. Osborne BJW, Marsh AK, Huibner S, Shahabi K, **Liu C**, Contente T, Nagelkerke NJD, Kovacs C, Benko E, Price L, MacDonald KS, Kaul R. Clinical and Mucosal Immune Correlates of HIV-1 Semen Levels in Antiretroviral-Naive Men. *Open Forum Infect Dis*. 2017 Feb 21;4(2):ofx033. doi: 10.1093/ofid/ofx033. eCollection 2017 Spring.
3. Prodger JL, Gray RH, Shannon B, Shahabi K, Kong X, Grabowski K, Kigozi G, Nalugoda F, Serwadda D, Wawer MJ, Reynolds SJ, **Liu CM**, Tobian AA, Kaul R. Chemokine levels in the penile coronal sulcus correlate with hiv-1 acquisition and are reduced by male circumcision in Rakai, Uganda. *PLoS Pathog*. 2016 Nov 29;12(11):e1006025.
4. **Liu CM**, Tobian AA, Kigozi G, Prodger J, Serwadda D, Nalugoda F, Kighoma N, Price LB, Gray RH. The PrePex male circumcision device and genital anaerobic bacterial overgrowth in Rakai, Uganda. *J Infect Dis*. 2016 Aug 15;214(4):595-8.
5. **Liu CM**, Tobian AA, Gray RH. Ockham's Razor and the PrePex male circumcision device. *J Infect Dis*. 2016 Jul 11. pii: jiw277.
6. **Liu CM**, Hungate BA, Tobian AA, Ravel J, Prodger JL, Serwadda D, Kigozi G, Galiwango RM, Nalugoda F, Keim P, Wawer MJ, Price LB, Gray RH. Penile microbiota and female partner bacterial vaginosis in Rakai, Uganda. *mBio*. 2015 June;6(3): e00589-15.
7. **Liu CM**, Price LB, Hungate, BA, Abraham A, Larsen LA, Christensen K, Stegger M, Skov R, Andersen PS. *Staphylococcus aureus* and the ecology of the nasal microbiome. *Sci Adv*. 2015 June;1(5): e1400216.
8. **Liu CM**, Kohanski MA, Mendiola M, Soldanova K, Dwan MG, Lester R, Nordstrom L, Price LB, Lane AP. Impact of saline irrigation and topical corticosteroids on the post-surgical sinonasal microbiota. *Int Forum Allergy Rhinol*. 2015 Mar;5(3):185-90.
9. **Liu CM**, Osborne BJW, Hungate BA, Shahabi K, Huibner S, Lester R, Dwan MG, Kovacs C, Contente-Cuomo TL, Benko E, Aziz M, Price LB, Kaul R. The semen microbiome and its relationship with local immunology and viral load in HIV infection. *PLoS Pathog*. 2014 Jul 24;10(7):e1004262.
10. Hong P, **Liu CM**, Nordstrom L, Lalwani AK. The role of the human microbiome in otolaryngology-head and neck surgery: A contemporary review. *Laryngoscope*. 2013 Nov 1.
11. **Liu CM**, Soldanova K, Nordstrom L, Dwan MG, Moss OL, Contente-Cuomo TL, Keim P, Price LB, Lane AP. Medical therapy reduces microbiota diversity and evenness in surgically recalcitrant chronic rhinosinusitis. *Int Forum Allergy Rhinol*. 2013 Jul 10. PMID: PMC4007209.
12. **Liu CM**, Hungate BA, Tobian AA, Serwadda D, Ravel J, Lester R, Kigozi G, Aziz M, Galiwango RM, Nalugoda F, Contente-Cuomo TL, Wawer MJ, Keim P, Gray RH, Price LB. Male circumcision significantly reduces prevalence and load of genital anaerobic bacteria. *mBio*. 2013 Apr 16;4(2):e00076.
13. **Liu CM**, Cosetti MK, Aziz M, Buchhagen JL, Contente-Cuomo TL, Price LB, Keim PS, Lalwani AK. The Otolologic Microbiome: A study of the bacterial microbiota in a pediatric patient with chronic otitis media using 16S rRNA gene-based pyrosequencing. *Arch Otolaryngol Head Neck Surg*. 2011 Jul;137(7):664-8
14. Price LB, **Liu CM**, Frankel YM, Melendez JH, Aziz M, Buchhagen J, Contente-Cuomo T, Engelthaler DM, Keim PS, Ravel J, Lazarus GS, Zenilman JM. Macroscale spatial variation in chronic wound microbiota: A cross-sectional study. *Wound Repair and Regeneration*. 2011 Jan-Feb;19(1):80-8.
15. Price LB\*, **Liu CM\***, Johnson KE, Aziz M, Lau MK, Bowers J, Ravel J, Keim PS, Serwadda D, Wawer MJ, Gray RH. The effects of circumcision on the penis microbiome. *PLoS One*. 2010 Jan 6;5(1):e8422. Note: \* denotes co-first authorship.

16. Price LB, **Liu CM**, Melendez JH, Frankel YM, Engelthaler D, Aziz M, Bowers J, Rattray R, Ravel J, Kingsley C, Keim PS, Lazarus GS, Zenilman JM. Community analysis of chronic wound bacteria using 16S rRNA gene-based pyrosequencing: impact of diabetes and antibiotics on chronic wound microbiota. *PLoS One*. 2009 Jul 31;4(7):e6462.
17. Dubin MG, **Liu C**, Lin SY, Senior BA. American rhinologic society member survey on "maximal medical therapy" for chronic rhinosinusitis. *Am J Rhinol*. 2007;21(4): 483-488.

#### **Peer-reviewed Diagnostics Development Manuscripts**

18. Stegger M\*, **Liu CM\***, Larsen J, Soldanova K, Aziz M, Contente-Cuomo T, Petersen A, Vandendriessche S, Jiménez JN, Mammina C, van Belkum A, Salmenlinna S, Laurent F, Skov RL, Larsen AR, Andersen PS, and Lance B. Price. Rapid differentiation between livestock-associated and livestock-independent *Staphylococcus aureus* CC398 clades. *PLoS One* 2013 Nov 14;8(11): e79645. Note: \* denotes co-first authorship.
19. **Liu CM**, Kachur S, Dwan MG, Abraham AG, Aziz M, Hsueh PR, Huang YT, Busch JD, Lamit LJ, Gehring CA, Keim P, Price LB. FungiQuant: a broad-coverage fungal quantitative real-time PCR assay. *BMC Microbiol*. 2012 Nov 8;12:25. PMID: PMC3565980.
20. **Liu CM**, Aziz M, Kachur S, Hsueh PR, Huang YT, Keim P, Price LB. BactQuant: an enhanced broad-coverage bacterial quantitative real-time PCR assay. *BMC Microbiol*. 2012 Apr 17;12:56. PMID: PMC3464140.
21. Foster JT, Price LB, Beckstrom-Sternberg SM, Pearson T, Brown WD, Kiesling DM, Allen CA, **Liu CM**, Beckstrom-Sternberg J, Roberto FF, Keim P. Genotyping of *Brucella* species using clade specific SNPs. *BMC Microbiol*. 2012 Apr 17;12:56.
22. **Liu CM**, Driebe EM, Schupp J, Kelley E, Nguyen JT, McSharry JJ, Weng Q, Engelthaler DM, Keim PS. Rapid quantification of single-nucleotide mutations in mixed influenza A viral populations using allele-specific mixture analysis. *J Virol Methods*. 2010 Jan;163(1):109-15.

#### **Peer-reviewed Environmental Health and Food Manuscripts**

23. **Liu CM\***, Stegger M\*, Aziz M, Johnson TJ, Waits K, Nordstrom L, Gauld L, Weaver B, Rolland D, Statham S, Horwinski J, Sariya S, Davis GS, Sokurenko E, Keim P, Johnson JR, Price LB. *Escherichia coli* ST131-H22 as a foodborne uropathogen. *Submitted*. Note: \* denotes equal contribution.
24. Wymore AS, Salpas E, Casaburi G, **Liu CM**, Price LB, Hungate BA, McDowell WH, Marks JC. Effects of plant species on stream bacterial communities via leachate from leaf litter. *Hydrobiologia*. Accepted.
25. Price LB, Hungate BA, Koch BJ, Davis GS, **Liu CM**. Colonizing opportunistic pathogens (COPs): the beasts in all of us. *PLoS Pathog*. 2017 Aug 10;13(8):e1006369. doi: 10.1371/journal.ppat.1006369.
26. Johnson TJ, Aziz M, **Liu CM**, Sokurenko E, Kisiela DI, Paul S, Andersen P, Johnson JR, Price LB Complete Genome Sequence of a CTX-M-15-Producing *Escherichia coli* Strain from the H30Rx Subclone of Sequence Type 131 from a Patient with Recurrent Urinary Tract Infections, Closely Related to a Lethal Urosepsis Isolate from the Patient's Sister. *Genome Announc*. 2016 May 12;4(3). pii: e00334-16.
27. Morrissey EM, Mau RL, Schwartz E, Caporaso JG, Dijkstra P, van Gestel N, Koch BJ, **Liu CM**, Hayer M, McHugh TA, Marks JC, Price LB, Hungate BA. Phylogenetic organization of bacterial activity. *ISME J*. 2016 Sep;10(9):2336-40.
28. Wymore AS, **Liu CM**, Hungate BA, Schwartz E, Price LB, Whitham, TG, Marks JC. The influence of time and plant species on the composition of decomposing bacteria in a stream ecosystem. *Microbial Ecology*. 2016 May;71(4):825-34.
29. Hungate BA, Mau RL, Schwartz E, Caporaso JG, Dijkstra P, van Gestel N, Koch BJ, **Liu CM**, McHugh TA, Marks JC, Morrissey E, Price LB. Quantitative microbial ecology through stable isotope probing. *Appl Environ Microbiol*. 2015 Nov 1;81(21):7570-81.

30. Davis GS, Waits K, Nordstrom L, Weaver B, Aziz M, Gauld L, Grande H, Bigler R, Horwinski J, Porter S, Stegger M, Johnson JR, **Liu CM**, Price LB. Intermingled *Klebsiella pneumoniae* populations between retail meats and human urinary tract infections. *Clin Infect Dis*. 2015 Jul 22. pii: civ428
31. Muller E, Pinel N, Laczny C, Hoopman M, Lebrun L, Roume H, May P, Hicks N, **Liu CM**, Price LB, Gillece J, Guignard C, Schupp J, Nikos V, Moritz R, Baliga N, Keim P, Wilnes P. Community integrated omics links the dominance of a microbial generalist to fine-tuned resource usage. *Nat Commun*. 2014 Nov; 5: 5603.
32. Mau RL, **Liu CM**, Aziz M, Schwartz E, Dijkstra P, Marks JC, Price LB, Keim PS, Hungate BA. Linking soil bacterial biodiversity and soil carbon stability. *ISME J*. 2014 Oct 28.
33. Hornstra HM, Hilsabeck R, Gates LT, Olivas SM, Birdsell DN, Hall CM, German S, Cook JM, Seymour ML, Priestley R, Kondas AV, Clark Friedman CL, Price EP, Schupp J, **Liu CM**, Price LB, Massung RF, Kersh GJ, Keim PS. High prevalence and two dominant host-specific genotypes of *Coxiella burnetii* in U.S. milk. *BMC Microbiol*. 2014 Feb 14;41.
34. Wymore AS, Compson ZG, **Liu CM**, Price LB, Whitham TG, Keim P, Marks JC. Contrasting rRNA gene abundance patterns for aquatic fungi and bacteria in response to leaf-litter chemistry. *Freshwater Science*. Jun 2013; 32(2): 663-672.
35. Nordstrom L, **Liu CM**, Price LB. Foodborne urinary tract infections: a new paradigm for antimicrobial-resistant foodborne illness. *Front Microbiol*. 2013;4:29.
36. Price LB, Stegger M, Hasman H, Aziz M, Larsen J, Andersen PS, Pearson T, Waters AE, Foster JT, Schupp J, Gillece J, Driebe E, **Liu CM**, Springer B, Zdovc I, Battisti A, Franco A, Zmudzki J, Schwarz S, Butaye P, Jouy E, Pomba C, Porrero MC, Ruimy R, Smith TC, Robinson DA, Weese JS, Arriola CS, Yu F, Laurent F, Keim P, Skov R, Aarestrup FM. *Staphylococcus aureus* CC398: host adaptation and emergence of methicillin resistance in livestock. *mBio*. 2012 Feb 21;3(1).
37. Davis MF, Price, LB, **Liu CM**, Silbergeld EK. An ecological perspective on U.S. industrial poultry production: the role of artificial ecosystems on the emergence of drug-resistant bacteria from agricultural environments. *Curr Opin Microbiol*. 2011 Jun;14(3):244-50.
38. Waters AE, Contente-Cuomo T, Buchhagen J, **Liu CM**, Watson L, Pearce K, Foster JT, Bowers J, Driebe EM, Engelthaler DM, Keim PS, Price LB. Multidrug-resistant *Staphylococcus aureus* in US meat and poultry. *Clin Infect Dis*. 2011 May;52(10):1227-30.

## PATENTS

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1. U.S. Patent No. 8,722,335, Methods and Kits Used in the Detection of Fungus, issued on May 13<sup>th</sup>, 2014.
2. U.S. Patent Application No. 12,908,536, Compositions and Methods To Detect Influenza Variants, published on April 21<sup>st</sup>, 2011.
3. U.S. Patent Application No. WO2016172686 A1, Compositions and Methods For Augmenting the Nasal Microbiome, published on October 27<sup>th</sup>, 2016.

## PRESENTATIONS

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### *Invited plenary sessions, conferences, and talks*

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| 2017 | <i>Examine the human nasal microbiome.</i> Maryland Institute for Applied Environmental Health Departmental Seminar. University of Maryland School of Public Health. Nov. 3 <sup>rd</sup> , 2017.      |
| 2017 | <i>Why Absolute Abundance Matters in Translational Microbiome Research.</i> IGS Seminar Series. Institute for Genome Sciences, University of Maryland School of Medicine. Mar. 8 <sup>th</sup> , 2017. |

- 2016 *Keynote Speaker, Opening Plenary Session.* Australasian HIV & AIDS Conference 2016. Adelaide, Australia. November, 2016.
- 2016 *Sexual Transmission of Genital Anaerobic Dysbiosis.* Australasian HIV & AIDS Conference 2016. November 16<sup>th</sup>, 2016.
- 2016 *Symposium on Biobanks and Industries Working Together to Advance Precision Medicine.* International Society for Biological and Environmental Repositories 2016 Annual Meeting. Berlin, Germany. April, 2016.
- 2016 *The Role of Genital Microbiome in HIV Susceptibility.* Departmental Research Seminar, Department of Environmental and Occupational Health, George Washington Milken Institute School of Public Health. April 25<sup>th</sup>, 2016.
- 2016 *Building and Using Web-Based Integrated Data Warehouses and Analysis Modules for Large-Scale Microbiome Research.* Office of Cyberinfrastructure and Computational Biology, National Institutes of Health. January 5<sup>th</sup>, 2016.
- 2015 *Plenary Session on Genital Microbiome and Susceptibility to Sexually-Transmitted Infections.* World STI & HIV Congress 2015, Brisbane, Australia. September, 2015.
- 2014 *Uncovering the Impact of Male Circumcision on HIV and the Microbiome.* Infectious Disease/Microbiology Interdisciplinary Research Symposium. Northwestern University Feinberg School of Medicine. May 14<sup>th</sup>, 2014.
- 2014 *Ecology of Staphylococcus aureus and commensals in the human nose.* 20<sup>th</sup> Annual International Meeting on Microbial Genomics. Sep. 14<sup>th</sup>, 2014.
- 2011 *Genome, Metagenome, Community: Interpreting Complex Data Types in the Clinic.* Traumatic Wound Microbiome Workshop, Bathesda, Maryland. May, 2011.
- 2010 *The Penis Microbiome: Uncovering the Impact of Male Circumcision.* 18<sup>th</sup> Annual International Meeting on Microbial Genomics. Sep. 13<sup>th</sup>, 2010.

### **Oral presentations**

- 2017 **Liu CM**, Prodder JL, Tobian AAR, Kaul K, Abraham A, Kigozi G, Nalugoda F, Serwadda D, Price LB, Gray RH. *Abundance of penile anaerobes, IL-8, and the risk of HIV acquisition, Rakai, Uganda.* 23<sup>rd</sup> Conference on Retroviruses and Opportunistic Infections (CROI).
- 2014 **Liu CM**, Kohanski MA, Price, LB, Lane, AP. *Nasal Irrigation Is Not Associated with Decreased Staphylococcus aureus or Pseudomonas in Post-Surgical Sinonasal Cavity.* AAO-HNSF Spring Meeting 2014.
- 2014 **Liu CM**, Kohanski MA, Price, LB, Lane, AP. *Nasal Irrigation Is Not Associated with Decreased Staphylococcus aureus or Pseudomonas in Post-Surgical Sinonasal Cavity.* AAO-HNSF Spring Meeting 2014.
- 2013 **Liu CM**, Keim, PS, Price, LB, Lane, AP. *Medical therapy reduces microbiota diversity and evenness in surgically recalcitrant chronic rhinosinusitis.* AAO-HNSF Spring Meeting 2013.

- 2010 **Liu CM**, Cosetti MK, Price LB, Keim PS, Lalwani AK. *The Otologic Microbiome: A Preliminary Report of Otopathogens In Cholesteatoma And Chronic Suppurative Otitis Media Using 16S rRNA Gene-Based Pyrosequencing Analysis*. Collegium Oto-Rhino-Laryngologicum Amicitiae Sacrum Annual Meeting.
- 2010 **Liu CM**, Lane AP, Aziz M, Buchhagen JL, Contente-Cuomo TL, Price LB, Keim PS. *The Human Paranasal Sinus Microbiota in Health and Disease*. NIH Human Microbiome Research Conference.
- 2010 **Liu CM**, Cosetti MK, Price LP, Keim PK, Lalwani AK. *Pyrosequencing-Based Analysis of the Middle Ear Microbiota*. AAO-HNSF Annual Meeting.
- 2008 Driebe EM, **Liu CM**, Bowers J, Schmoker M, Bosch C, Engelthaler DE. *Counting cocci: Quantitation of Coccidioides using real-time PCR*. Coccidioidomycosis Study Group Annual Meeting.
- 2006 Tan BK, **Liu CM**, Lin S, Lane AP, Dubin MG. *Failure of the frontal sinus obliteration procedure*. American Rhinologic Society Annual Meeting.
- 2006 Dubin MG, **Liu CM**, Senior BA, Lin S. *American Rhinologic Society member survey on "Maximal medical therapy"*. American Rhinologic Society Annual Meeting.
- 2006 **Liu CM**, Dubin MG, Martin B, Lane AP. *Effect of smoking on maximal medical therapy for chronic rhinosinusitis*. American Rhinologic Society Annual Meeting.

#### **Poster presentations**

- 2015 **Liu CM**, Tobian AA, Prodder JL, Serwadda D, Kigozi G, Nalugoda F, Wawer MJ, Kaul R, Price LB, Gray RH. Association between foreskin microbiota and local cytokines in men from Rakai, Uganda. 21<sup>st</sup> Conference on Retroviruses and Opportunistic Infections (CROI).
- 2014 **Liu CM**, Hungate BA, Tobian AA, Ravel J, Prodder JL, Serwadda D, Nalugoda F, Wawer MJ, Gray RH, Price LB. Female partner bacterial vaginosis and the penis microbiome: Rakai, Uganda. 20<sup>th</sup> Conference on Retroviruses and Opportunistic Infections (CROI).
- 2013 **Liu CM**, Hungate BA, Tobian AA, Serwadda D, Lester R, Kigozi G, Galiwango RM, Wawer MJ, Keim P, Gray RH, Price LB. The Impact of Male Circumcision on the Penis Microbiome: Analyses from Rakai, Uganda. 19<sup>th</sup> Conference on Retroviruses and Opportunistic Infections (CROI).
- 2010 **Liu CM**, Cosetti, MK, Aziz M, Buchhagen JL, Contente-Cuomo TL, Price LB, Lalwani, AK, Keim PS. *A Comparative Study of The Middle Ear Microbiota in Chronic Suppurative Otitis Media and Cholesteatoma*. NIH Human Microbiome Research Conference.
- 2010 **Liu CM**, Cosetti MK, Price LP, Keim PK, Lalwani AK. *The Otologic Microbiome: A case study of the bacterial microbiota in a pediatric patient with chronic suppurative otitis media*. American Society of Pediatric Otolaryngology Spring Meeting.
- 2009 Price L, Johnson K, Rattray R, **Liu C**, Ravel J, Keim P, Engelthaler D, Serwadda D, Wawer M, Gray R. *Circumcision is Associated with Significant Changes in the Penis Bacterial Microbiota*. Conference on Retroviruses and Opportunistic Infections (CROI).
- 2009 **Liu CM**, Keim PS, Lane AP. *Characterization of Bacterial Microbiota in Post-Surgical Maxillary Sinus of Chronic Rhinosinusitis (CRS) Patients Using Molecular 16S rRNA Gene-Based Analyses*. American Rhinologic Society Annual Meeting.

- 2008            Nguyen J, Hoopes J, **Liu CM**, Scheff K, Smee D, Driebe E, Le M, Engelthaler D, Keim P, Went G. *Modeling the kinetics of the Influenza A resistance under drug pressure*. CAAC/IDSA Annual Meeting.
- 2004            **Liu CM**, Keller AS, Hindin MJ (2004). *Counter Measures to Intimate Partner Violence in Metro Cebu, Philippines*. International Health & Medical Education Consortium (IHMEC) Conference.
- 2015            *Penile Microbiome and the PrePex Device*. WHO Informal Consultation on Tetanus and Voluntary Medical Male Circumcision, Geneva, Switzerland. March 9<sup>th</sup>, 2015.

### **COMMITTEE AND ADMINISTRATIVE SERVICE**

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- 2016-Current    *Member* – Public Health Laboratory Faculty Committee (GWU)
- 10/2017        *Ad Hoc Reviewer* – Clinical Research and Field Studies of Infectious Diseases Study Section (CRFS), National Institutes of Health

### **EXTERNAL ACTIVITIES**

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- 2016-Current    *Co-Founder* – Your Private Biome: A Citizen Scientist Project ([www.yourprivatebiome.org](http://www.yourprivatebiome.org))

### **PROFESSIONAL SOCIETIES**

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- Current        *Member* – American Society for Microbiology
- Current        *Member* – American Association for Clinical Chemistry
- Current        *Member* – American Society for Clinical Pathology
- Current        *Member* – College of American Pathologists

### **EDITORIAL SERVICE**

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- Periodic        *Ad hoc Reviewer* – *PLoS Pathogens*, *PLoS One*, *Microbiome*, *Emerging Microbes & Infections*

### **TEACHING EXPERIENCE**

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#### ***Courses Taught***

- 2015-2017      *Guest Lecturer* – Public Health Genomics, George Washington University
- 2017            *Guest Lecturer* – Germs, George Washington University
- 2016            *Guest Lecturer* – Health and the Environment, George Washington University
- 2016            *Guest Lecturer* – Molecular Epidemiology, George Washington University
- 2011            *Lecturer* – Undergraduate Research Seminar, Center for Microbial Genetics and Genomics, Northern Arizona University

#### ***Students and Trainees***

Doctoral

2015-Current *Alexis Brown* – Ph.D. Candidate in Environmental Health, Johns Hopkins University (Thesis Committee Member)

Masters

2016-Current *Kelsey Roach* – Masters of Public Health, George Washington University (Research Co-Advisor)

2016-Current *Pei-Ying Chang* – Masters of Public Health, George Washington University (Research Co-Advisor)

2015-2016 *Abbey Woolverton* – Masters of Public Health, George Washington University (Research Co-Advisor)

Interns and Mentored Research

2011-2013 *Owain Moss* – Research intern, Translational Genomics Research Institute and Northern Arizona University (Mentor)

2010-2013 *Michael Dwan* – Research intern, Translational Genomics Research Institute and Northern Arizona University (Mentor)

2011-2013 *Katerina Soldanova* – Research intern, Translational Genomics Research Institute and Northern Arizona University (Mentor)

2011-2012 *Elyse Marcuccella* – Research intern, Translational Genomics Research Institute and Northern Arizona University (Mentor)

2012-2013 *Heidi Grande* – Undergraduate research intern, Translational Genomics Research Institute and Northern Arizona University (Co-Mentor)

2011-2013 *Brett Weaver* – Research intern, Translational Genomics Research Institute and Northern Arizona University (Co-Mentor)

2011-2012 *Kara Waits* – Research intern, Translational Genomics Research Institute and Northern Arizona University (Co-Mentor)

2010-2012 *Joseph Horwinski* – Undergraduate research intern, Translational Genomics Research Institute and Northern Arizona University (Co-Mentor)

**PUBLIC HEALTH PRACTICE PORTFOLIO**

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***Briefings Testimonies, and Consultations******National***

9/26/2016 *Invited Participant.* Small Meeting on Antibiotic Stewardship in Outpatient Settings: A Focus on Retail Clinics and Urgent Care Facilities. The Centers for Disease Control and Prevention, Atlanta, Georgia.

***International***

3/9/2015 *Consultant.* WHO Informal Consultation on Tetanus and Voluntary Medical Male Circumcision, Geneva, Switzerland.