BIOGRAPHICAL SKETCH

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NAME: Catherine M. Loc-Carrillo

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POSITION TITLE: RESEARCH ASSISTANT PROFESSOR, SCHOOL OF MEDICINE, UNIVERSITY OF UTAH

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
University of Wales Institute, Cardiff, U.K.	B.Sc. (Hons)	05/1998	Biomedical Sciences
Nottingham Trent University, Nottingham, UK	M.Sc.	12/1999	Biotechnology
University of Nottingham, U.K.	Ph.D.	03/2005	Microbiology
Nottingham Trent University, Nottingham, UK	Postdoctoral Fellow	07/2005	Food Microbiology
The Evergreen State College, Olympia, WA	Postdoctoral Fellow	06/2006	Phage Biology
Institute for Environmental Health, Lake Forest Park, WA	Research Associate	12/2007	Food Microbiology
University of Utah, Salt Lake City, UT	Postdoctoral Fellow	01/2012	Musculoskeletal Infections

A. Personal Statement

As a researcher, I work on translational research to build the bridge between bench to bedside healthcare. I enjoy collaborating with clinicians who have firsthand experience of what their patients need and work with them as a team to find solutions to their patients' problems. I hold faculty positions with the University of Utah (Departments of Internal Medicine, Pathology, and Surgery) and am a VA investigator at the Salt Lake City VA Health Care System. My research interests lie primarily within the fields of microbiology and infectious disease. I have worked with bacteriophage for over 20 years and focus on their applications as potential therapeutic agents in conjunction with antibiotics to treat antibiotic-resistant bacterial infections, as well as their application as surrogates to safely study the transmission of viruses within healthcare settings.

B. Positions, Scientific Appointments, and Honors

Positions

1996 – 1997 Trainee Medical Laboratory Scientific Officer, Microbiology Department, Public Health Laboratory Services. University Hospital of Wales, Cardiff, Wales. UK.
2003 – 2004 Research Assistant, Department of Biosciences. Nottingham Trent University, Nottingham, UK.
2007 – 2009 Senior Researcher/Lead Scientist, OmniLytics Inc. Salt Lake City, Utah, US.
2010 – 2017 Micro – Phage Lab Manager, SLC VA Veterinary Medical Unit. University of Utah, Salt Lake City, UT.
2011 – Present Principal Investigator, George E. Wahlen Department of Veterans Affairs Medical Center. Salt Lake City, UT.
2012 – 2015 Research Instructor, Department of Orthopaedics. University of Utah, Salt Lake City, UT.
2013 – Present Adjunct Instructor, Department of Pathology. University of Utah, Salt Lake City, UT.
2014 – 2017 Research Program Manager, Informatics, Decision Enhancement and Surveillance (IDEAS) Center, SLC VA Research Division, Division of Epidemiology. University of Utah, Salt Lake City, UT.

2015 – Present Adjunct Instructor, Department of Surgery. University of Utah, Salt Lake City, UT.
2017 – Present Research Assistant Professor, Department of Internal Medicine. University of Utah, Salt Lake City, UT.
2017 – Present Program Director, Infectious Disease Research Program for the Informatics, Decision Enhancement and Surveillance (IDEAS) Center, SLC VA Research Division, Division of Epidemiology. University of Utah, Salt Lake City, UT.
2017 – Present Director, Micro–Phage Epi Lab, SLC VA Veterinary Medical Unit. University of Utah, Salt Lake City, UT.

Scientific Appointments

2010 – 2014 Scientific Advisory Board Member, International Society for Viruses of Microorganisms
2010 – 2013 Planning Committee & Session Chair, Evergreen International Phage Biology Meeting
2011 – Present Review Editor, Frontiers in Microbiology
2012 – 2015 Student Membership Committee Member, American Society for Microbiology
2012 – 2014 Associate Editor–in–Chief, Journal of Postdoctoral Research
2013 – 2016 Organization Committee Member, Evergreen International Phage Biology Meeting
2015 Israel Science Foundation, ad hoc reviewer
2016 Ad Hoc Reviewer, Industrial Research Fund KU Leuven (IOF)
2016 Ad Hoc Reviewer, Canadian Poultry Research Council
2016 External Reviewer, AO Foundation, Switzerland
2019 Grant Review Committee, Reviewer, Support for Conferences and Scientific Meeting (R13), National Institute for Allergy and Infectious Diseases
2019 Grant Review Committee, Reviewer, Discovery Award Antimicrobial Resistance, Peer Reviewed Medical Research Program (PRMRP), Congressionally Directed Medical Research Programs (CDMPR), Department of Defense
2019 – Present Grant Review Committee, Reviewer, Exploration of Antimicrobial Therapeutics and Resistance SEP (R21 and R03), Center for Scientific Review, NIH
2019 – Present Subcommittee on Research Safety, Member. This is a subcommittee of the Salt Lake City VA's Research & Development Committee (RDC). The purpose of this subcommittee is to oversee all research safety, security, environmental and emergency response programs.
2020 Grant Review Committee, Reviewer, SUPER Follow on Fund, Biotechnology and Biological Sciences Research Council (BBSRC), United Kingdom
2020 Reviewer, Phage Biology and Bacteriophage Therapy SEP (R21), Center for Scientific Review
2021 Scientific Reviewer, Discovery Award, Peer Reviewed Medical Research Program (PRMRP), Congressionally Directed Medical Research Programs (CDMPR), Department of Defense
2021 – 2022 Scientific Reviewer, Intramural Funding, Military Infectious Disease Research Program (MIDRP), Prolonged Field Care, US Army Medical Research and Development Command, Department of Defense

Honors

1999 EU Scholarship, European Masters in Biotechnology, Nottingham Trent University, UK
2002 President’s Fund Award, Society for Applied Microbiology, UK
2014 Vice President's Clinical & Translational Research Scholar, University of Utah, UT, USA

C. Contributions to Science

1. During my doctorate degree, I investigated the ***application of bacteriophages as biocontrol agents*** to reduce the campylobacter load on broiler chickens entering the human food chain. *Campylobacter* is a natural inhabitant of the chicken gut, however they account for the majority of bacterial enteritis in most of the developed world. The goal of my doctoral thesis was to identify a decontamination technique that wouldn’t change the nutritional properties of the food, was safe, inexpensive, and acceptable to the public. After isolating and characterizing *Campylobacter*-specific phages, two phages were used to assess their efficacy at decontaminating a colonized chicken model that we developed. Publications associated with this research were among the initial research towards understanding the kinetics and processes necessary to determine the feasibility of phage therapy as a sustainable biological control measure, which can be used to reduce campylobacters emanating from farmed poultry sources.

a. **Loc Carrillo C**, Atterbury RJ, el-Shibiny A, Connerton PL, Dillon E, Scott A, Connerton IF. Bacteriophage therapy to reduce *Campylobacter jejuni* colonization of broiler chickens. *Appl Environ Microbiol.* 2005 Nov;71(11):6554-6563. doi: 10.1128/AEM.71.11.6554-6563.2005. **Cited: 439**
b. Scott AE, Timms AR, Connerton PL, **Loc Carrillo C**, Radzum KA, Connerton IF. Genome dynamics of *Campylobacter jejuni* in response to bacteriophage predation. *PLoS pathogens*. 2007 Aug;3(8). **Cited: 175**
c. Connerton PL, **Loc Carrillo C**, Swift C, Dillon E, Scott A, Rees CE, Dodd CE, Frost J, Connerton IF. Longitudinal study of *Campylobacter jejuni* bacteriophages and their hosts from broiler chickens. Appl. Environ. Microbiol.. 2004 Jul 1;70(7):3877-83.
d. **Loc Carrillo CM**, Connerton PL, Pearson T, Connerton IF. Free-range layer chickens as a source of Campylobacter bacteriophage. Antonie Van Leeuwenhoek. 2007 Oct 1;92(3):275.

2. During my postdoctoral years, I expanded my interest in foodborne pathogens. Prior to entering industry and gaining hands-on experience in working with *Bacillus cereus*, E. coli O157:H7, Lactobacillus species, *Listeria monocytogenes*, and Salmonella, I worked on *Enterobacter sakazakii* in Dr. Forsythe's laboratory. Our focus was on ***Enterobacter sakazakii* and related organisms associated with neonatal infections**. *Cronobacter sakazakii* is an opportunistic pathogen and we investigated its associated with the ingestion of reconstituted infant formula resulting in neonatal meningitis, necrotizing enterocolitis, and sepsis.
   a. Townsend SM, Hurrell E, Caubilla-Barron J**, Loc-Carrillo C**, Forsythe SJ. Characterization of an extended-spectrum beta-lactamase *Enterobacter hormaechei* nosocomial outbreak, and other *Enterobacter hormaechei* misidentified as *Cronobacter (Enterobacter) sakaz*akii. *Microbiology.* 2008 Dec;154(Pt 12):3659-3667. doi: 10.1099/mic.0.2008/021980-0.
   b. Townsend S, Caubilla Barron J, **Loc-Carrillo C**, Forsythe S. The presence of endotoxin in powdered infant formula milk and the influence of endotoxin and *Enterobacter sakazakii* on bacterial translocation in the infant rat. *Food Microbiol.* 2007 Feb;24(1):67-74. doi: 10.1016/j.fm.2006.03.009. **Cited: 121**
   c. Caubilla-Barron J, Hurrell E, Townsend S, Cheetham P, **Loc-Carrillo C**, Fayet O, Prere MF, Forsythe SJ. Genotypic and phenotypic analysis of *Enterobacter sakazakii* strains from an outbreak resulting in fatalities in a neonatal intensive care unit in France. *J Clin Microbiol.* 2007 Dec;45(12):3979-3985. doi: 10.1128/JCM.01075-07. **Cited: 239**

3. Collaborations at the University of Utah, with a number of surgeons interested in finding solutions to surgical site infections and bone infections, has lead me to the field of translational research. Under the mentorship of Drs. Agarwal, Beck, and Kubiak, I co-developed a number of **small animal models to study the prevention and treatment of wound infections and osteomyelitis**. We focus on studying the pharmacokinetics of new/alternative antimicrobials, develop new/alternative methods to prevent/treat wound infections, and evaluate the efficacy of a drug or procedure using: micro-CT imaging with the Quantum FX system; bioluminescent bacteria to follow the progression of infection; and the Bioplex system to evaluate inflammatory cytokine levels.
   a. Working ZM, Frederiksen H, Drew A, **Loc-Carrillo C**, Kubiak EN. Bone penetrance of locally administered vancomycin powder in a rat femur fracture model. *Injury.* 2017 Jul;48(7):1459-1465. doi: 10.1016/j.injury.2017.04.040.
   b. **Loc-Carrillo C**, Wang C, Canden A, Burr M, Agarwal J. Local Intramedullary Delivery of Vancomycin Can Prevent the Development of Long Bone *Staphylococcus aureus* Infection. *PLoS One.* 2016;11(7):e0160187. doi: 10.1371/journal.pone.0160187.
   c. Sinclair KD, Pham TX, Williams DL, Farnsworth RW, **Loc-Carrillo CM**, Bloebaum RD. Model development for determining the efficacy of a combination coating for the prevention of perioperative device related infections: a pilot study. Journal of Biomedical Materials Research Part B: Applied Biomaterials. 2013 Oct;101(7):1143-53.
   d. **Loc-Carrillo C**, Beck JP. Animal Models of Surgical Phage Applications Talk presented at: 20th Biennial Evergreen International Phage Meeting; Aug. 4-9, 2013; Olympia, Washington. https://www.youtube.com/watch?v=vavdHhJPD4w

4. Combining the technical skills and knowledge gained from my PhD thesis and the development and use of translational animal models, I'm interested in investigating the feasibility of using **phage-antibiotic combination (PAC) treatments to combat multidrug-resistant infections.** Currently, treatments for bacterial infections associated with biofilms require high doses and long courses of systemic antibiotics, which are costly, cumbersome and can have undesirable side effects. There is an urgent need to develop novel strategies to prevent and treat antibiotic-resistant bacterial infections. The use of phage therapy (i.e.,

bacterial viruses used to kill target bacteria) is being revisited after decades of being overshadowed by antibiotics. Our recent findings showed that combining phages and antibiotics can result in a synergistic effect, where the bacterial load of a *S. aureus* biofilm was reduced to a greater extent than either antimicrobial treatment alone. Presentations and publications associated with this research are highlighted below:

a. Wang C., Joo H., Tidwell A., Agarwal J., **Loc-Carrillo C**., Advantages and Disadvantages of Phage and Antibiotic Combination (PAC) Treatments Against *Staphylococcus aureus* and *Pseudomonas aeruginosa*. Rapid Fire Talk: ASM Microbe. June 20-24, 2019; San Francisco, California.
b. **Loc-Carrillo C.** Combining Bacteriophage and Antibiotics for Wound Infections**.** Invited talk: Phage Futures Congress. Jan. 29-30, 2019; Washington DC.
c. Chan BK, Abedon ST, **Loc-Carrillo C**. Phage cocktails and the future of phage therapy. Future microbiology. 2013 Jun;8(6):769-83. **Cited: 683**
d. **Loc-Carrillo C**, Abedon ST. Pros and cons of phage therapy. *Bacteriophage.* 2011 Mar;1(2):111-114. doi: 10.4161/bact.1.2.14590. **Cited: 674**

Complete List of Published Work in MyBibliography:
https://www.ncbi.nlm.nih.gov/sites/myncbi/1tWZkpfx7bf/bibliography/40898168/public/?sort=date&direction=descending