CHARLES M. BRIDGES, M.S., Ph.D.

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PROFESSIONAL EXPERIENCE

Research Associate I, University of Connecticut — December 2025-Present
Postdoctoral Research Associate, University of Connecticut — July 2021-December 2025
Adjunct Faculty Instructor of Virology, University of Connecticut — January 2024-May 2024
Teaching & Research Assistant, University of Connecticut — August 2011-July 2021

EDUCATION

PhD, Molecular & Cell Biology — August 2021
University of Connecticut, Storrs, CT
MS, Microbiology — May 2013
University of Connecticut, Storrs, CT
BS, Molecular and Cell Biology — May 2011
University of Connecticut, Storrs, CT
Continuing studies — August 2007- June 2009
Manchester Community College, Manchester, CT
AA, Liberal Arts — May 2007
Asnuntuck Community College, Enfield, CT

ADVANCED TRAINING

National Center for CryoEM Access and Training (NCCAT)/ New York Structural Biology Center (NYSBC) — April 2025
Cryo-electron microscopy (cryoEM) grid preparation training

Bacterial and Viral Bioinformatics Resources Center (BV-BRC)/ Argonne National Laboratory — February 2025
Bioinformatics workshop for genomic pathogen data

PEER-REVIEWED PUBLICATIONS

1. Juliana R. Cortines, **Charles M. Bridges**, Sundharraman Subramanian, Jason R. Schrad, Glauber R. S. Araújo, Gabriel Henrique Pereira Nunes, Juliana dos Santos Oliveira, Victor Alejandro Essus, Jônatas S. Abrahão, Simon White, Kristin N. Parent, Carolyn Teschke. (2024). Transition metals and oxidation reactions trigger stargate opening during the initial stages of the replicative cycle of the giant Tupanvirus. mBio, (https://doi.org/10.1128/mbio.02192-24).
2. Justin C. Leavitt, Brianna M. Woodbury, Eddie B. Gilcrease, **Charles M. Bridges**, Carolyn M. Teschke and Sherwood R. Casjens. (2023). Bacteriophage P22 SieA mediated superinfection exclusion. mBio, (https://doi.org/10.1128/mbio.02169-23).
3. Christopher J. Hawxhurst*, Jamie L. Micciulla*, **Charles M. Bridges**, Mikhael Shor, Leslie M. Shor, Daniel J. Gage. (2023). Soil protists can actively redistribute beneficial bacteria along *Medicago truncatula* roots. Applied and Environmental Microbiology (https://doi.org/10.1128/aem.01819-22).
4. **Charles M. Bridges** & Daniel J. Gage. (2021). Draft genome sequences of *Dysgonomonas* sp. strains GY75 and GY617, isolated from the hindgut of *Reticulitermes flavipes*. Microbial Resource Announcements, (https://doi.org/10.1128/MRA.00079-21).
5. **Charles M. Bridges**, Michael C. Nelson, Joerg Graf, Daniel J. Gage. (2021). Draft genome sequences of *Dysgonomonas* sp. strains BGC7 and HGC4, isolated from the hindgut of a lower termite. Microbial Resource Announcements, (https://doi.org/10.1128/MRA.01427-20).

6. **Charles M. Bridges** & Daniel J. Gage. (2021). Development and application of aerobic, chemically defined media for *Dysgonomonas*. Anaerobe, (https://doi.org/10.1016/j.anaerobe.2020.102302).
7. Azady Pirhanov, **Charles M. Bridges**, Reed A. Goodwin, Yi-Syuan Guo, Jessica Furrer, Leslie M. Shor, Daniel J. Gage, Yong Ku Cho. (2021). Optogenetics in *Sinorhizobium meliloti* enables spatial control of exopolysaccharide production and biofilm structure. ACS Synthetic Biology, (https://doi.org/10.1021/acssynbio.0c00498).

MANUSCRIPTS IN PREPARATION

Charles M. Bridges & Daniel J. Gage. "A genetic toolkit for *Dysgonomonas*: plasmids for mutagenesis and *in vivo* reporter expression". *(In preparation).*

Yi-Syuan Guo, Azady Pirhanov, **Charles M. Bridges**, Reed A. Goodwin, Jessica Furrer, Daniel J. Gage, Yong Ku Cho, Leslie M. Shor. "*In situ* light-switchable EPS production to inhibit water loss in the rhizosphere". (*In preparation*)

CLASSROOM & LABORATORY TEACHING EXPERIENCE

- **MCB 3246/5240, Virology (Adjunct Faculty instructor)**
- MCB 4624, Experiments in Bacterial Genetics
- MCB 3633, Pathogenic Microbiology
- MCB 2610, Microbiology
- BIO 1107, Introduction to Biology
- PLSC 4210 – Plant Physiology (*tutor*)

LECTURES & ORAL PRESENTATIONS

Flash Talk, Phage and Virus Assembly Conference, Hyannis, Massachusetts. "Conserved Residues in the A-Domain of P22 Coat Protein are Crucial for Maintaining Hydrophobic Interactions During Procapsid Assembly and Maturation"; *Selected from abstracts,* June 2025

Selected Speaker, XXVIII Biennial Conference on Phage/Virus Assembly, Pott Shrigley, United Kingdom. "Genetic regulation of procapsid assembly by a catalytic scaffolding protein"; *Selected from abstracts,* June 2023.

Selected Speaker*,* Pioneer Valley Microbiology Symposium, Amherst, Massachusetts. "Implementation of engineered *Dysgonomonas* to study interactions in the termite hindgut"; *Selected from abstracts,* January 2020.

Invited Speaker*,* Natural Sciences Department Science Colloquium, Castleton University, Vermont. "Implementation of engineered symbionts to study interactions in the termite hindgut"; October 2019.

Invited Speaker*,* Dr. Kathleen Feldman, Fundamentals of Microbiology, University of Connecticut. "Implementation of genetically engineered *Dysgonomonas* to study microbial interactions in the termite hindgut."; June 2019.

UConn MCB Graduate Seminar, "Development of a genetic system to study host-symbiont interactions in the termite gut"; October 2016

Guest Lecture, Dr. Joerg Graf, Pathogenic Microbiology; University of Connecticut. "Antibiotics"; December 2015.

UConn MCB Graduate Seminar*,* Exploring the role of contact-mediated communication the hindgut of the lower termite *Reticulitermes flavipes*; March 2013.

2nd Annual CT Symbiosis Meeting – Exploring the role of contact-mediated communication the hindgut of the lower termite *Reticulitermes flavipes*; March 2012.

PEER-REVIEWED JOURNAL REFEREE

Archives of Virology (Springer-Nature) 2023-present
Microbiology Spectrum (American Society for Microbiology) 2021-present

SKILLS

- **Laboratory management**
  - Collaborate with PI to alleviate bottlenecks, overcome impediments and advance research projects
  - Provide leadership, mentorship and support to lab group members
  - Implement and ensure compliance of laboratory safety protocols
  - Coordinate equipment purchase, installation and maintenance
  - Organize & run group meetings
- **Virology**
  - Growth & purification of bacteriophages
  - Analysis of structural mutants
  - Transmission Electron Microscopy
- **Bacteriology:**
  - Media preparation, culturing
  - Fastidious/ anaerobic bacteria
  - Physiological assays
- **Genetics:**
  - Conjugation, electroporation
  - Chemical & light induction methods
  - Site-directed & transposon mutagenesis methods
- **Molecular biology:**
  - DNA/RNA preparation
  - Plasmid & synthetic circuit design
  - Restriction, Gibson, & overlap-extension PCR cloning
- **Genomics**
  - Bacterial genome assembly & QC
  - Comparative genomics
- **Cell biology:**
  - Cell fixation, fluorescent labeling
  - Fluorescence microscopy
  - Image analysis
- **Biochemistry**
  - Density gradient centrifugation
  - Protein expression/ purification
  - SDS-PAGE
  - Column chromatography
- **Computation/ Bioinformatics**
  - Unix/Linux high-performance computing clusters
  - Bash, Python & R programming languages
- **Microfluidic device design & utilization**
- **Insect collection & husbandry**

RESEARCH EXPERIENCE

Postdoctoral Advisor: **Professor Carolyn M. Teschke**

Dept. of Molecular & Cell Biology, University of Connecticut, Storrs CT 2021– Present

Postdoctoral research:

- Biochemical & genetic analysis of *Salmonella* phage P22 assembly
- Development of *in vitro* DNA packaging in phage P22
- Structural characterization of coliphage lambda for phage therapy
- Understanding the role of metal-binding proteins in giant virus (Tupanvirus) infection

Graduate Advisor: **Professor Daniel J. Gage**

Dept. of Molecular & Cell Biology, University of Connecticut, Storrs CT 2011 – 2021

Dissertation Focus:

- Development of optimal aerobic culturing conditions for genus *Dysgonomonas*
- Physiological characterization of novel *Dysgonomonas* isolates from *Reticulitermes flavipes*
- Comparative genomics of members of *Dysgonomonas*
- Development of a genetic toolkit for studying host-microbe interactions in *Reticulitermes flavipes*
- Use of engineered *Dysgonomonas* for gene expression *in vivo*

Auxiliary PhD projects:

- Development of fluorescent reporters in *Sinorhizobium meliloti & Pseudomonas putida*
- Development of broad host-range vectors for consistent & reliable gene expression in *Escherichia*

coli, Sinorhizobium meliloti & Pseudomonas putida
- Use of optogenetics to control EPS-II biosynthesis in *Sinorhizobium meliloti*
- Development of methods to increase biocompatibility of 3D-printed resins used in microfluidics
- Determination of response of termite gut protists to oxygen gradients
- Development of a soil water potential sensor in *Pseudomonas putida*

Master's projects:
- Size sorting of termite gut protists using microfluidic devices
- Characterization of *bspA*-like genes in termite hindgut transcriptome
- Analysis of LRR-domain containing genes in *R. flavipes* hindgut transcriptome
- Development of PHB-synthesis reporter constructs in *Sinorhizobium meliloti*

POSTER PRESENTATIONS

Charles M. Bridges, Persephone A. Hill, Carolyn M. Teschke. Conserved Residues in the A-Domain of P22 Coat Protein are Crucial for Maintaining Hydrophobic Interactions During Procapsid Assembly and Maturation. Phage and Virus Assembly Conference, 2025.

Charles M. Bridges, Carolyn M. Teschke. Investigation of a Conserved Interior Loop in the A-Domain of P22 Coat Protein as a Secondary Site of Scaffolding Protein Interaction. FASEB Virus Structure and Assembly Conference, 2024.

Sichu Wang, **Charles M. Bridges**, Carolyn M. Teschke. Investigating the Structure and Function of Bacteriophage P22 GP14. FASEB Virus Structure and Assembly Conference, 2024.

Charles M. Bridges & Carolyn M. Teschke. Development of an *in vitro* DNA packaging system in bacteriophage P22. FASEB Virus Structure and Assembly Conference, 2022.

Jamie L. Micciulla, Christopher J. Hawxhurst, **Charles M. Bridges**, Leslie M. Shor, Daniel J Gage. Protist facilitated transport of rhizosphere beneficial bacteria, *Sinorhizobium meliloti*. ISOP & ISEP Online Poster Session on Protists, 2020.

Charles M. Bridges, Daniel J. Gage. Implementation of genetically engineered *Dysgonomonas* to study microbial interactions in the termite hindgut. Gordon Research Conference, Animal-Microbe Symbioses, 2019.

Azady Pirhanov, Yi-Syuan Guo, Charles Bridges, Reed Goodwin, Jessica M. Furrer, Daniel J. Gage, Leslie M. Shor, Yong Ku Cho. Optical control of exopolysaccharide production in *Sinorhizobium meliloti* in a synthetic soil microsystem. American Chemical Society Annual Meeting, 2019.

Charles M. Bridges, Reed A. Goodwin, Jessica Furrer, Yongku Cho, Leslie M. Shor, Daniel J. Gage. Spatio-temporal control of EPSII production in *Sinorhizobium meliloti* using optogenetics. Boston Bacterial Meeting, 2017.

Rowena K. Ahia, **Charles M. Bridges**, Michael C. Nelson, Joerg Graf, Daniel J. Gage. Genomic analysis and growth characterization of two novel *Dysgonomonas* isolates from the termite *Reticulitermes flavipes*. Boston Bacterial Meeting, 2017.

Christopher J. Hawxhurst, Andrea L. Kadilak, **Charles M. Bridges**, Daniel J. Gage and Leslie M. Shor. Improving Biocompatibility of 3D Printed Stereolithography Resins. American Institute of Chemical Engineers Annual Meeting, 2017.

Charles M. Bridges, Michael C. Nelson, Joerg Graf & Daniel J. Gage. Development of a Genetic Platform to Study the Role of Physical Host-Symbiont Interactions in the Lower Termite *Reticulitermes flavipes*. 6th ASM Conference on Beneficial Microbes, 2016.

C. A. Harrington, A. L. Kadilak, A. M. Pierne, E. B. Gilcher., M. S. Cyr, **C. M. Bridges**, M. E. Stephens, D. J. Gage. Cell culture of the termite gut microbiome using a 3D-printed synthetic microhabitat. American Institute of Chemical Engineers Annual Meeting, 2016.

Cameron A. Harrington, Andrea L. Kadilak, **Charles M. Bridges**, Daniel J. Gage and Leslie M. Shor. Biocompatibility

of 3D Printer Material to Bacterial Cultures. American Institute of Chemical Engineers Annual Meeting, 2016.

Elise Gilcher, Mitchell Cyr, **Charles Bridges**, Leslie M. Shor and Daniel J. Gage. Microbial Response in a Synthetic Termite Gut Microenvironment with Micro-Oxygen Gradients. American Institute of Chemical Engineers Annual Meeting, 2015.

Charles M. Bridges & Daniel J. Gage. Exploring the Role of BspA-like Proteins in Contact-Mediated Communication in the Hindgut of the Lower Termite *Reticulitermes flavipes*. American Society for Microbiology General Meeting, 2014.

Michael Nelson, Pascal LaPierre, **Charles Bridges**, Daniel Gage, Joerg Graf. Illumina RNA-Seq analysis of the hindgut microbiome in the termite *Reticulitermes flavipes*. International Symposia for Microbial Ecology, 2014.

MENTORSHIP & ADVISEMENT

UConn iGEM (International Genetically Engineered Machine) Team — 2022-present
Graduate-Postdoc Advisory Board
UConn Connects Mentorship Program — 2022-present
Undergraduate mentor

PUBLIC SERVICE & OUTREACH

Valley Preschool, Granby, CT — April 2023
Ages 3-4, "Invisible Organisms"
Valley Preschool, Granby, CT — April 2019
Ages 3-4, "Invisible Organisms"
Valley Preschool, Granby, CT — April 2018
Ages 3-4, "Invisible Organisms"
UConn Kids are Scientists & Engineers, Too (KASET) Program — August 2014
"Magnificent Microbes"
UConn Undergraduate ASM *Microbe Film Festival* — November 2012
CT State Museum of Natural History Cooperative Extension Program — October 2012
The Artificial Termite Gut
CT State Museum of Natural History Cooperative Extension Program — October 2012
Backyard Microbiology — September 2011

FELLOWSHIPS, HONORS & AWARDS

UConn Connects David T. Ouimette Outstanding Mentor Award, September 2023
Awarded 'Best Talk' at Pioneer Valley Microbiology Symposium, January 2020
UConn Doctoral Student Travel Award, January 2019; ($750)
UConn Doctoral Dissertation Fellowship, December 2018; ($2,000)
Antonio and Marjorie Romano Graduate Education Fellowship, April 2018; ($1,500)
International Honor Society *Phi Theta Kappa*, inducted December 2006
Dean's List: Jan 2004 – May 2008; August 2010 – May 2011

PROFESSIONAL AFFILIATIONS

International Society for Viruses of Microorganisms (2022-present)
American Society for Virology (2022-present)
International Society of Protistologists (2019-present)
American Society for Microbiology (2011-present)