

Curriculum Vitae

Cheryl A. Nickerson, Ph.D.

Professor of Life Sciences, School of Life Sciences
Center for Fundamental and Applied Microbiomics
Co-leader, ASU Space Life Sciences and Health Initiative

The Biodesign Institute
Arizona State University
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Tempe, AZ 85287-5401

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<https://search.asu.edu/profile/929790>

PROFESSIONAL EDUCATION

Tulane University Newcomb College New Orleans, Louisiana	1979-1983	B.S., Biology
University of Missouri Columbia, Missouri	1985-1988	M.S., Genetics
Louisiana State University Baton Rouge, Louisiana	1988-1994	Ph.D., Microbiology Minor in Biochemistry
Washington University St. Louis, Missouri	1994-1998	Postdoctoral Fellow Bacterial Pathogenesis Vaccine Development

RESEARCH EXPERIENCE, POSITIONS AND APPOINTMENTS

September 1985 - May 1988

M.S. graduate research in the laboratory of Dr. Paul Agris, University of Missouri
(Department of Biology)

Research focus: Characterizing the structure-function relationship of the tRNA
Gln₂ molecule in *Escherichia coli*

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September 1988 - May 1994

Ph.D. graduate research in the laboratory of Dr. Eric C. Achberger, Louisiana State University (Department of Microbiology)

Research focus: Investigating the role of curved DNA in promoter recognition with *Bacillus subtilis* and *Escherichia coli* RNA polymerases

May 1994 – April 1998

Postdoctoral fellow in the laboratory of Dr. Roy Curtiss III, Washington University, St. Louis, MO

Research focus: Molecular genetic and phenotypic characterization of *Salmonella enterica* serovar Typhimurium pathogenesis and host responses to infection; Development and testing of live recombinant attenuated *Salmonella* vaccine strains

May 1998 – July 2003

Assistant Professor, Department of Microbiology and Immunology, Tulane University School of Medicine
Faculty Member, Interdisciplinary Program of Molecular and Cellular Biology, Tulane University School of Medicine
Co-Director, Tulane Environmental Astrobiology Center

Research focus: Mechanobiology of infectious disease - characterization of bacterial pathogen responses to fluid shear force environments encountered in the infected host and in the microgravity of spaceflight; Effect of spaceflight on microbial pathogenesis, stress responses, host-pathogen interactions, infectious disease and astronaut health; Establishment, validation, application of 3-D biomimetic tissue culture models as predictive human surrogates to study host-pathogen interactions and infectious disease mechanisms

July 2003 – January 2006

Associate Professor, Department of Microbiology and Immunology, Tulane University School of Medicine
Faculty Member, Interdisciplinary Program of Molecular and Cellular Biology, Tulane University School of Medicine
Co-Director, Tulane Environmental Astrobiology Center
Founding Director, *Tulane Center of Excellence in Bioengineering*

Research focus: Same as above

January 2006 – May 2011

Associate Professor of Life Sciences, School of Life Sciences
Center for Infectious Diseases and Vaccinology, The Biodesign Institute, Arizona State University

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Research focus: Mechanobiology of infectious disease - Focus on characterizing the connection between cellular biomechanics and host-pathogen systems biology. Understanding the effect of mechanical forces (fluid shear and reduced gravity) on both microbial and human cells, impact on microbial pathogenesis, stress responses, biofilm formation, host-microbe interactions, infectious disease mechanisms, translation to clinical and biotechnology applications; Establishment, validation, application of 3-D biomimetic tissue culture models as predictive human surrogates to study host-pathogen and host-microbiome interactions and antimicrobial efficacy; Effect of spaceflight on microbial responses that impact astronaut health, integrity and function of spacecraft life support systems, space habitat sustainability

May 2011 – Dec 2015

Professor of Life Sciences, School of Life Sciences
Center for Infectious Diseases and Vaccinology
The Biodesign Institute, Arizona State University

Research focus: Same as above

Dec 2015 – Aug 2016

Professor of Life Sciences, School of Life Sciences
Interim Director, Center for Infectious Diseases and Vaccinology, The Biodesign Institute, Arizona State University

Research focus: Same as above

Sept 2016 - 2019

Professor of Life Sciences, School of Life Sciences
Co-Leader, Internal Advisory Board, Center for Immunotherapy, Vaccines, and Virotherapy, The Biodesign Institute, Arizona State University

Research focus: Same as above

July 2019 - present

Professor of Life Sciences, School of Life Sciences
Center for Fundamental and Applied Microbiomics, The Biodesign Institute, Arizona State University
Co-Leader and Founder, *ASU Space Life Sciences and Health Initiative*

Research focus: Same as above

HONORS AND AWARDS

Outstanding Graduate Teaching Assistant in Biology, University of Missouri, 1987

Cheryl A. Nickerson, Ph.D.

Outstanding Graduate Teaching Assistant in Arts and Sciences, University of Missouri, 1987

N.S.F. Grant for Young Investigators to participate in “tRNA International Symposium”, Umea, Sweden, 1987

National Research Service Award (NRSA), Medical Scientist Research Training Grant, Department of Health and Human Services (NIH), Postdoctoral trainee, Washington University School of Medicine, *Infectious Diseases/Basic Microbial Pathogenic Mechanisms*, Jan 1997- Jan 1998

Scientific Consultant for NASA Life Sciences Program, Johnson Space Center, Houston, Texas, 1998-present

Scientific Advisory Board, Tulane Environmental Astrobiology Center, Tulane University Health Sciences Center, 1999-2006

Co-Director, Tulane Environmental Astrobiology Center, Tulane University Health Sciences Center, 2001-2006

Founding Director, Tulane Center of Excellence in Bioengineering, Tulane University Health Sciences Center, 2004-2006

Newcomb College Fellow, August 2000-2005

Keynote Speaker, Newcomb College Freshman Initiation Ceremony, August 29, 2000

Charles C. Randall Lectureship Award for Outstanding Young Faculty Member, South Central Branch of the American Society for Microbiology (ASM), 2000

Presidential Early Career Award for Scientists and Engineers (PECASE), 2001

- *Presented by President George W. Bush at the White House*
- *The highest honor bestowed by the United States Government on science and engineering professionals in the early stages of their independent research careers.*

Spaceflight biomedical research from my lab highlighted on a television documentary for presentation on PBS and before a United States Congressional Subcommittee, 2002

Invited participant, U.S. National Academy of Sciences, Annual Beckman Frontiers of Science Symposium, Irvine, California, November, 2002

Awarded by New Orleans City Business as “*Woman of the Year*”, New Orleans, Louisiana, 2002

NASA Spaceflight Experiments:

- Research experimental payload on-board NASA Space Shuttle mission 9A (STS-112) to the International Space Station (ISS), Sept 2002, to study effect of spaceflight on microbial pathogenesis
- Research experimental payload on-board Russian Progress flight 13P to the ISS, Jan 2004, to study effect of spaceflight on commensal microbial responses
- Research experimental payload on-board NASA Space Shuttle mission 12A (STS-115) to the ISS, Sept 2006, to study effect of spaceflight on microbial virulence, stress responses, and gene expression (transcriptome, proteome)
- Research experimental payload on-board NASA Space Shuttle mission 1JA (STS-123) to the ISS, March 2008, to study effect of spaceflight on microbial virulence, gene expression (transcriptome, proteome), nutritional countermeasure and antimicrobial efficacy
- Research experimental payload on-board NASA Space Shuttle mission 19A (STS-131) to the ISS, April 2010, to study effect of spaceflight on infection of 3-D biomimetic human cell culture models and multi-omics profiling of both host and pathogen responses
- Research experimental payload on-board the historic final NASA Space Shuttle mission (STS-135) to the ISS, July 2011, to study effect of spaceflight on the efficacy of a live recombinant attenuated *Salmonella* vaccine strain
- Research experimental payload on-board SpaceX-5 mission to the ISS, Jan 2015, to study in real time the effect of spaceflight on infection process in nematodes, transcriptomic profiling of both host and pathogen, and countermeasure testing
- Research experimental payload on-board SpaceX-21 mission to the ISS, Dec 2020, to study effect of spaceflight on microbial biofilm formation, disinfection efficacy, and corrosion of spaceflight materials used in life support systems
- Research experimental payload on-board SpaceX-29 mission to the ISS, Dec 2023 (re-flight), to study effect of spaceflight on microbial biofilm formation, disinfection efficacy, and corrosion of spaceflight materials used in life support systems
- Research experimental payload (launch date TBD) to study germicidal UV light on inhibition of microbial biofilms in spaceflight water systems

Nominated by Louisiana Governor Mike Foster and U.S. Senator John Breaux for

Cheryl A. Nickerson, Ph.D.

NASA's Astronaut Candidate Program, 2003

NASA Astronaut Candidate Finalist - Astronaut Class of 2004

Outstanding Newcomb College Alumnae, 2004

Nominated for Distinguished Teaching Award, Arizona State University, Spring, 2007

Invited testimony to the House Committee on Science and Technology, Subcommittee on Space and Aeronautics, hearing on "*NASA's International Space Station Program: Status and Issues*", Washington, D.C., April 24, 2008

Invited panel member, "*Experts Meeting on Organization of Decadal Study in Microgravity Research*", National Academy of Sciences, Washington, D.C., May 15-16, 2008

Invited speaker and panel member, Howard Hughes Medical Institute (HHMI) Interfaces Scholars Career Panel, Chevy Chase, MD, September 15-18, 2008

Invited expert panel member, NIH Round Table Discussion on *3-D Tissue Models for Inclusion in Transformative ROIs* - NIH Office of Portfolio Analysis and Strategic Initiatives, NIBIB/NIH, Bethesda, MD, October 24, 2009

Invited testimony to the Senate Committee on Commerce, Science and Transportation; Subcommittee on Science and Space, hearing on "*Consequences of the Gap in Human Space Flight*", Washington, D.C., May 7, 2009

NASA Technology Brief Award, 2009 – for innovation in patent filing *Methods and Compositions Based on Culturing Microorganisms in Low Sedimental Fluid Shear Conditions*

Invited presenter, *Panel on Plant and Microbial Biology of the Decadal Survey on Biological and Physical Sciences in Space*, National Academy of Sciences, Washington, D.C., October 8, 2009

Invited participant, NIH/NCI Think Tank, *Rethinking the Role of Infectious Agents in Cancer*, Washington, D.C., March 14-16, 2010

NASA Johnson Space Center Director's Innovation Group Achievement Award, May 20, 2010

NASA Exceptional Scientific Achievement Medal, August 2011

- *Presented by Michael Coats, Astronaut and Director, NASA Johnson Space Center*

Cheryl A. Nickerson, Ph.D.

- *Awarded for unusually significant scientific contribution toward achievement of aeronautical or space exploration goals*

Finalist, Arizona BioIndustry Association's (AzBIO) Research Excellence Award, October 2011. Nominated by Arizona State University (ASU)

- *Awarded to the life science researcher in Arizona who has made the most significant contribution to the advancement of knowledge and the understanding of biological processes, as measured by publications and/or professional acknowledgement of their work in either an academic or commercial setting.*

American Association for the Advancement of Science (AAAS) Podcast interview covering my invited presentation in the session *Science from the International Space Station*, AAAS annual meeting, Boston, MA, February 2013

Based on my lab's spaceflight research experience, the Biodesign Institute at ASU was awarded a rare *Space Act Agreement* with NASA to use the International Space Station (ISS) for biomedical research. ASU is one of the few privileged entities nationwide to have unlimited access to the U.S. National Laboratory aboard the ISS for the purposes of space life and health sciences research

Spaceflight research highlighted on the *PBS News Hour* television documentary series with science correspondent Miles O'Brien, 2013

Invited panel member, National Academy of Sciences, Immunology Subcommittee for NASA decadal review, May 30, 2013

- *Outcome of meetings reported to the National Academy of Sciences and National Research Council for use in their recommendations to NASA to establish research priorities to ensure the health, safety, and performance of astronauts during long duration space missions.*

Founding Editor-in-Chief, *Nature Publishing Group* journal, *npj Microgravity*.

Dedicated to publishing the most important scientific advances in the life sciences, physical sciences, and engineering fields that are facilitated by spaceflight and spaceflight analogue platforms. 2015 - present

- <http://www.nature.com/npjmicrograv/>

Featured Scientist Interview, Google Science Fair Hangout, in collaboration with *Nature Publishing Group* and *Scientific American*, Oct 10, 2014

Nominated by ASU to serve on the United States Air Force Scientific Advisory Board, Jan 2015

Nominated for the *Zebulon Pearce Distinguished Teaching Award*, College of Liberal Arts and Sciences, Arizona State University, Spring 2015

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Interim Director, Center for Infectious Diseases and Vaccinology, the Biodesign Institute, Arizona State University. December 2015 – August 2016

Invited panel member, National Academy of Sciences, Engineering and Medicine's Committee on A Midterm Assessment of Implementation of the Decadal Survey on Life and Physical Sciences Research at NASA, April 19, 2017

Nickerson, C.A., Ott, C.M., Pellis, N., (Eds). *Effect of Spaceflight and Analogue Culture on Human and Microbial Cells: Novel Insights into Disease Mechanisms*. Kluwer Academic/Plenum Press, New York. 2016. 310 p.

- *This book received the 2017 Life Sciences book award from the International Academy of Astronautics*

Spaceflight research featured in the French National Television documentary film, “*Homo Spatius*”, which explores the physiological and psychological challenges of long duration human spaceflight. Features personal testimony of astronauts and scientist interviews from leading laboratories doing spaceflight biomedical research, 2018

Finalist - Director, Translational Research Institute, Baylor College of Medicine, Houston, TX, 2017

Selected as invited speaker, TEDxASU: *Boundless*, March 31, 2018, Tempe Center for the Arts, Tempe, AZ

Scientific Advisor, *Starbridge Venture Capital*, which supports commercial spaceflight research on both government and commercial spaceflight platforms to make future spaceflight efforts intellectually rewarding and financially profitable. 2018-2024

Space Systems Advisory Board, *American Center for Manufacturing and Innovation* (ACMI), 2024 – present.

American Society for Microbiology (ASM) Distinguished Lecturer, 2018-2020

Nominated for the *Zebulon Pearce Distinguished Teaching Award*, College of Liberal Arts and Sciences, Arizona State University, Spring, 2019

Featured PBS interview and video at the Barrett-Jackson Collector Car Auction in Phoenix, AZ, which featured my lab's spaceflight biomedical research in tandem with my passion for racing sportscars. This series was followed by a second PBS video to film my laboratory and research team at the Biodesign Institute at ASU. Jan 19, 2019
<https://azpbs.org/catalyst/2019/06/catalyst-racing-against-infectious-diseases/>

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Featured interview on my lab's spaceflight biomedical research in support of NASA's human exploration program to coincide with coverage of the 50th Anniversary of the Apollo 11 Moon Landing, ABC 15 television, July 15, 2019

Nominated as a Fellow of the American Academy of Microbiology (AAM), Society for Microbiology (ASM), October 2023

Invited speaker and participant, Host-Microbe Biology retreat for the American Society for Microbiology (ASM) Council on Microbial Sciences, May 30 – June 1, 2023.
Presentation title: *Mechanobiology and Phenotypic Plasticity in Modeling Host-Microbe Biology: From Human and Animal Health to Habitat Sustainability*. The goal of this meeting is to provide ASM with a vision of the future of host-microbe interaction research in the next 20 years, and the opportunities and resources needed to address these challenges.

Invited participant, the White House Office of Science and Technology Policy (OSTP) and the U.S. State Department, *International Lunar Year Briefing*, Washington, D.C., July 13, 2023

MEMBERSHIPS, COMMITTEES, AND ELECTED OFFICES

American Society for Microbiology (ASM), 1990-present

American Association for the Advancement of Science (AAAS), 1998-present

American Society for Gravitational and Space Research (ASGSR), 2008-present

Scientific Consultant for NASA Life Sciences Program, Johnson Space Center, Houston, Texas, 1998-present

Governing Board, Elected Member, American Society for Gravitational and Space Biology (ASGSB), now known as American Society for Gravitational and Space Research (ASGSR), 2008-2010

Graduate Student Association, elected Graduate Student Representative, Department of Microbiology, Louisiana State University, 1993-1994

Dean's Advisory Council, Graduate Student Representative, Nominated Member, Louisiana State University, 1993-1994

Graduate Admissions Committee, Department of Microbiology and Immunology, Tulane University Medical Center, 1998-Jan 2006

Search Committee, Department of Microbiology and Immunology, Tulane University Medical Center, 1998-Jan 2006

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Appointed by the Tulane University Senate to the Senate's Committee on Social Issues, 2001-2002

Graduate Faculty Committee, Tulane University Medical Center, 2002 – Jan 2006

Recruiting and Publications Subcommittee, Department of Molecular and Cellular Biology, Tulane University Medical Center, 2000-Jan 2006

Louisiana Alliance for Minorities Program (LAMP), Mentor, 1999-2000

Secretary of the General Medical Faculty, Tulane University Medical Center, 2000-2001

Appointed by the Tulane University Senate to the Senate's Committee on Social Issues, 2001-2002

Tulane University Medical Center Faculty Advisory Committee, Basic Science Representative, elected member, Tulane University Medical Center, 2002–Jan 2006

Clinical Diagnosis Curriculum Review Committee, Tulane University Medical Center, 2003-2004

Institutional Biosafety Committee, Tulane University Medical Center, 2004-Jan 2006

Member of Faculty of Interdisciplinary Program of Molecular and Cellular Biology, Tulane University Medical Center, 1998-2006

Departmental Personnel and Honors Committee, Tulane University Medical Center, 2003-Jan 2006

Clinical Diagnosis Curriculum Review Committee, Tulane University Medical Center, 2003-2004

Graduate Program Director for the Department of Microbiology and Immunology, Tulane University Medical Center, 2004 –Jan 2006

Motivational speaker for under-privileged youth in Baton Rouge and New Orleans, LA., 2005

Microbial Risk Assessment Panel, invited member, NASA Johnson Space Center, Houston, TX, 2007

Honors Disciplinary Faculty, Arizona State University, 2006-present

Arizona Aerospace Institute Working Group, ASU Invited Committee Member, 2009 – present

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ASU Biodesign Institute Personnel Committee, Invited Committee Member, September 2009 – 2013

ASU Faculty Oversight Committee for Microbiology labs, appointed member, 2009

Invited member, *Expert Group for Development of Strategic Research Enabling European Human Space Exploration*, European Science Foundation, Cedex, France, Spring 2009

Science Council, Appointed Member, Division of Space Life Sciences at Universities Space Research Association (USRA), 2010 – 2016

Cell and Molecular Biology (CMB) graduate programs representative, ASU, 2012 – 2019

Invited Member, Immunology Working Group for the NASA Decadal Review of the Role of Sex/Gender in Adaptation to Spaceflight, 2013-2014

Invited Committee Member and Session Chair, Institute of Medicine, National Academy of Sciences review of NASA's Evidence Reports of Human Health Risks, July 2014

Invited Member, Institute of Medicine/National Academy of Sciences committee, *Review of NASA's Evidence Reports on Human Health Risks*, May – November, 2014

Appointed member, ASU School of Life Sciences (SoLS) Assessment Committee, 2014 - 2015

Appointed member, ASU SoLS Director Search Committee, July 2014 – 2015

Invited Committee Member, NASA Science Advisory and Strategic Planning Committee for Life Beyond Low Earth Orbit (LBLEO), July 2015 - present

Appointed member of the *ASU Research DESIGN Council* (led by President Dr. Michael Crow and Dr. George Poste) with the charter to identify and define a series of high profile, large scale pan-university Tier 3 (DECISIVE) research projects with audacious objectives to chart the research vision for the next 10 years at ASU. August 2016 – August 2019

Appointed member, Stem Cell Biology Search Committee, ASU. October 2016 – Spring 2017

Invited member, Scientific Advisory Board, European Union Postdoctoral Training Grant in Microbial Interactions, 2017 – 2020

Appointed by ASU President Michael Crow to lead ASU spaceflight commercialization efforts in biology and biotechnology, 2017 - present

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Appointed by ASU President Michael Crow to establish and lead the *ASU Space Life Sciences and Health Initiative* - a cohesive large scale, interdisciplinary space life sciences and biomedical initiative at the scale and complexity necessary to be a world leader. This Initiative builds and advances collaborations between academia, medical, government, philanthropic and commercial entities to ignite a paradigm shift to solve human health and environmental challenges in space and on Earth; and trains the next generation of researchers to build America's future in space life and health sciences. Co-leadership of this effort with Dr. George Poste, 2018 – present.

Leader (ASU), *Mars Habitat Summit*, sponsored by ASU Knowledge Enterprise (KE) Research Development. A joint interdisciplinary effort between ASU and the University of Arizona to plan, develop and implement a Mars human habitat program in Arizona. 2019-2021

Scientific Planning Committee member, Invited Presenter, *Nature-NASA* Conference on the “*Microbiology of Human Spaceflight*”, NASA Johnson Space Center, Houston, TX, June 26-28, 2019

Organizing Committee Member, Invited Keynote Speaker, *Commercial Spaceflight Federation* annual meeting, The Biodesign Institute, Arizona State University, Tempe, AZ, Sept 16, 2019

Member, ASU Adjunct and Affiliate Faculty Committee, May 2020 – present

Invited Steering Committee Member, Biomanufacturing Thought Leadership Symposium, the Kennedy Space Center, Cape Canaveral, FL, Nov 18-19, 2020

Invited Committee Member, NASA Working Group Steering Committee to shape the future of space biosciences research. Recommendations to be submitted to the *National Academies Decadal Survey on Physical and Biological Sciences in Space*. Aug 2020 - 2022

Invited Member, Beyond Low Earth Orbit (BLEO) Science Working Group to advise NASA's Lunar Explorer Instrument for Space Biology Applications (LEIA). October 2020 - March 2021

Invited Panel Member, Science Working Group to advise commercial spaceflight and NASA on human health and performance hazards of deep space exploration to Mars. Sponsored by Commercial Civil Space at Lockheed Martin, George Washington University, Washington D.C., Feb 1-3, 2022

Invited author on a White Paper to the National Academies of Sciences entitled “*A Vision for the Next Generation of Spaceflight Microbiology: Human Health and Habitat Sustainability*”, submitted to the Decadal Survey on Biological and Physical Sciences Research in Space 2023-2032. Conducted by the National Academies of Sciences,

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Engineering and Medicine to help shape the future of NASA spaceflight biological research funding <https://ntrs.nasa.gov/citations/20210022952>

Invited Panelist, Site Visit panelist for the National Science Foundation's (NSF) Established Program to Stimulate Competitive Research (EPSCoR), 2023

Appointed member, *Reimagining SOLS - Promoting Research Interactions Committee*, Aug 2023 – present

Invited member, *Restructuring SOLS Committee*, 2023 – present

Chair, Knowledge Enterprise Academic Professional Personnel Committee for non-tenure track faculty promotions, 2024

Appointed member, ASU SoLS Faculty Reorganization Committee, Jan 2023 – present

Invited participant, *Engineering Biology Research Consortium's (EBRC) Space Health Roadmap Leadership Team*. Participation in the development of a technical research roadmap that envisions engineering biology solutions to human health and well-being in Space, Georgia Tech University, Atlanta, GA, May 14-14, 2024

Invited judge (in person), ASU School of Life Sciences 3 Minute Thesis (3MT) Competition for Graduate Students, ASU October 29, 2024

ASU SoLS Personnel Committee, 2024 – 2027

ASU SoLS Personnel Committee – member of the Subcommittee tasked with developing a new Narrative Evaluation Form to facilitate the annual faculty evaluation process, 2025 - present

Member, ASU Space Strategy Committee, 2025 – present

Invited member, ASU Science Technology and Health (STHealth) Advisory Committee for the ASU Health Observatory, 2025 - present. The purpose of this committee is to hear from ASU's leading health scientists and health leaders on how the Health Observatory can better fulfill the promise of the ASU Health mission and the ASU Charter and support the overall health of all Arizonans.

REVIEWER AND EDITORIAL RESPONSIBILITIES

Reviewer for the following journals:

- *Infection and Immunity*, 2000-present
- *Journal of Bacteriology*, 2004-present
- *Applied and Environmental Microbiology*, 2004-present

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- *mSphere*, 2020-present
- *Applied Microbiology and Biotechnology*, 2008-present
- *Journal of Applied Microbiology*, 2011-present
- *Molecular Microbiology*, 2003–present
- *Environmental Microbiology*, 2007-present
- *Trends in Microbiology*, 2004-present
- *Frontiers in Microbiology*, 2018-present
- *Journal of Molecular Signaling*, 2009-present
- *Journal of Biotechnology*, 2012-present
- *Tissue Engineering*, 2012-present
- *Journal of Gravitational Physiology*, 2003–present
- *Systems and Synthetic Biology*, 2007-present
- *Journal of Proteomic Research*, 2010-present
- *FEMS Microbiology Letters*, 2009-present
- *PLoS ONE*, 2010-present
- *Biotechnology Progress*, 2015-present
- *Enzyme and Microbial Technology*, 2018-present
- *Microbiology Open*, 2011-present
- *Scientific Reports*; 2015-present
- *Journal of Visualized Experiments (JOVE)*, 2018-present
- *npj Biofilms and Microbiome*, 2015-present
- *Biofilm*, 2022-present
- *npj Microgravity*, 2015 - present
- *Proceedings of the National Academy of Sciences*, 2009-present
- *Nature Communications*, 2015-present
- *Advanced Biology*, 2024 - present
- *Science*, 2005-present
- *Lancet*, 2023 - present

Editorial Responsibilities:

- *Southeastern Naturalist*, 2011- 2014

Editorial Board member:

- *Encyclopedia of Life Sciences*, John Wiley and Sons, Ltd. 2008-2009.
- *Microbiology Open*, Wiley–Blackwell open access journal, 2011 – 2012
- Academic Editor, Editorial Board, *PLoS ONE*, 2014 - 2015

Founding Editor-in-Chief:

- *Nature Publishing Group* journal, *npj Microgravity*. Dedicated to publishing the most important scientific advances in the life sciences, physical sciences, and engineering fields that are facilitated by spaceflight and spaceflight analogue platforms. May 2015 - present.

GRANT REVIEW PANELS

Cheryl A. Nickerson, Ph.D.

National Space Biomedical Research Institute (NSBRI), Section of Immunology,
Infection, and Hematology

NASA Astrobiology Institute (NAI)

NASA Postdoctoral Program (NPP)

NASA Science Mission Directorate (SMD)

NASA Space Biology Program

NASA Biological and Physical Sciences

NASA Artemis Program

Translational Research Institute for Space Health (TRISH)

Natural Sciences and Engineering Research Council of Canada

U.S. Civilian Research and Development Foundation (CRDF)

National Science Foundation (NSF)

The Burroughs Wellcome Fund

FUNDING

Past Support

Salmonella genes necessary for colonization of the GALT

Louisiana Educational and Quality Support Fund/Board of Regents Support Fund
(LEQSF/BORSF)

Cheryl A. Nickerson, Ph.D. (PI)

Period: 6/99-6/2002

Amount of Award; \$132,273

Salmonella genes necessary for colonization of the GALT

National Foundation for Infectious Disease (NFID)

Cheryl A. Nickerson, Ph.D. (PI)

Period: 6/99-6/2000

Amount of Award: \$4,000

Subcontract 9920-287-27, Universities Space Research Association (USRA)

Cheryl A. Nickerson, Ph.D., (PI)

Cheryl A. Nickerson, Ph.D.

Period: 2/99-10/99

Amount of Award: \$40,000

Effect of Simulated Microgravity on Gene Expression in the Enteric Pathogen Salmonella typhimurium

Cheryl A. Nickerson, Ph.D. (PI)

Agency: National Aeronautics and Space Administration (NASA) Period: 8/99-8/2004,

Amount of Award: \$619,142

Subcontract 9920-287-33, Universities Space Research Association (USRA)

Cheryl A. Nickerson, Ph.D. (PI)

Period: 1/01-9/01

Amount of Award: \$50,000

Identifying the proteins that mediate the ionizing radiation resistance of Deinococcus radio durans R1

John Battista (PI); Cheryl A. Nickerson, Ph.D. (Co-I)

Agency: Department of Energy (DOE)

Period: 10/01/01 – 9/30/04

Amount of Award: \$1,200,000

Novel Tissue Assemblies: Models for Enteric Pathogenesis

Cheryl A. Nickerson, Ph.D. (PI)

Agency: National Aeronautics and Space Administration (NASA)

Period: 07/01/01 – 08/01/06

Amount of Award: \$587,000

Tulane Center of Excellence in Bioengineering

Cheryl A. Nickerson, Ph.D. (PI)

Tulane University Wall Fund

Period: 7/01/04- 6/30/06

Amount of Award: \$250,000

Effect of Spaceflight on Microbial Gene Expression and Virulence

Cheryl A. Nickerson, Ph.D. (PI)

Agency: National Aeronautics and Space Administration (NASA)

Period: 4/01/02–3/31/10

Amount of Award: \$1,200,419

Development of Functional Assays for Pathogen Detection and Viability

Tim Straub (PI); Cheryl A. Nickerson, Ph.D. (Co-PI)

Agency: Department of Homeland Security (DHS)

Period: 5/01/06–4/30/08

Amount of Award: \$1,200,000

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A representative 3-D organotypic model of human lung epithelium to study airway biofilm formation caused by Pseudomonas aeruginosa

Pre-doctoral fellowship for research in the U.S.

International student award to Aurélie Crabbé

Mentor: Cheryl A. Nickerson, Ph.D.

Agency: Belgian American Educational Foundation (BAEF)

Period: 8/01/06–7/31/08

Amount of Award: \$30,000

Commercialization of Norovirus Vaccine Technology in Arizona

Charles Arntzen, Ph.D. (PI); Cheryl A. Nickerson, Ph.D. (Co-PI)

Agency: Science Foundation Arizona (SFAz)

Period: 7/01/08–6/30/09

Amount of Award: \$495,866

Effect of Spaceflight Associated Stress on mRNA Expression Profiles

Subcontract, Universities Space Research Association (USRA)

Cheryl A. Nickerson, Ph.D. (PI)

Period: 5/05-10/10

Amount of Award: \$33,000

Microbial Modeling and Characterization toward Spaceflight Risk Assessment

Subcontract, Universities Space Research Association (USRA)

Cheryl A. Nickerson, Ph.D. (PI)

Period: 5/07-6/11

Amount of Award: \$38,000

Development of a robust assay for infective Noroviruses for use in food safety diagnostics

Cheryl A. Nickerson, Ph.D. (PI)

Agency: USDA

Period: 9/01/08–11/30/11

Amount of Award: \$290,000

Recellularization of decellularized human lung scaffolds using the rotating wall vessel bioreactor technology for tissue generation and transplantation

Cheryl A. Nickerson, Ph.D. (PI)

Agency: ASU-Mayo Seed grant

Period: 10/13/10–11/30/11

Amount of Award: \$40,000

3-D Organotypic Model of HIV-infectable Tissue for AIDS-associated dementia

Cheryl A. Nickerson, Ph.D. (PI)

Agency: National Institutes of Health (NIH)

Period: 8/01/08–8/30/11

Amount of Award: \$302,000

Cheryl A. Nickerson, Ph.D.

Evaluation of host-pathogen interactions during exposure to microgravity analogues

Cheryl A. Nickerson, Ph.D. (PI)

Agency: National Aeronautics and Space Administration (NASA)

Period: 4/01/04 - 10/31/12

Amount of Award: \$694,417

RNA Binding Proteins as Evolutionarily Conserved Cellular Spaceflight Response Mechanisms

Cheryl A. Nickerson, Ph.D. (PI)

Agency: NASA and Department of Defense (DoD)

Period: 8/01/09–7/30/13

Amount of Award: \$450,000

Bioengineering new lungs from cadaveric scaffold

Daniel Weiss, M.D., Ph.D. (PI); Cheryl A. Nickerson, Ph.D. (Co-PI)

Agency: NIH

Period: 10/13/10–9/12/13

Amount of Award: \$1,207,000

Efficacy of Antimicrobials on Bacteria Cultured in a Spaceflight Analogue

Mark Ott, Ph.D. (PI), Cheryl A. Nickerson, Ph.D. (Co-PI)

Agency: NASA

Period: 6/01/12–5/30/14

Amount of Award: \$100,000

Physiological tissue models for bacterial colonization

Cheryl A. Nickerson, Ph.D. (PI)

Agency: Kimberly Clark

Period: 7/1/13–8/30/14

Amount of Award: \$130,000

Characterization of Microorganisms from the International Space Station Potable Water System: Understanding Microbial Responses that Could Impact Flight Operations

Cheryl A. Nickerson, Ph.D. (PI)

Agency: NASA

Period: 7/1/14–9/30/14

Amount of Award: \$14,000

Synergistic Effects of Chronic Low Dose Radiation and Microgravity Analogue Culture on Human Surrogate 3-D Tissues

Cheryl A. Nickerson, Ph.D. (PI)

Agency: USRA

Period: 5/01/2016-8/15/16

Amount of Award: \$40,000

Combined Effects of Microgravity Analogue Culture and Incremental Oxygen Levels on

Cheryl A. Nickerson, Ph.D.

Bacterial Pathogen Adaptive Responses

Cheryl A. Nickerson, Ph.D. (PI)

Agency: NASA

Period: 2/1/15–8/1/16

Amount of Award: \$100,000

Is Nuclear Structure a Driver of Dormancy?

ASU, Office of Knowledge Enterprise/Development

Stuart Lindsay, Ph.D. (PI), Cheryl A. Nickerson, Ph.D. (Co-I)

Period: 10/1/15 – 9/30/16

Amount of Award: \$115,000

A New Dimension in Modeling Irritable Bowel Syndrome (IBS) to Elucidate Novel Diagnostic Biomarkers and Microbiome Signatures

Cheryl A. Nickerson, Ph.D. (PI)

Agency: ASU-Mayo Seed Grant

Period: 2/1/2015-8/31/16

Amount of Award: \$40,000

RNA Deep Sequencing and Metabolomic Profiling of Microgravity-Induced Regulation of the Host-Pathogen Interaction: An Integrated Systems Approach

Cheryl A. Nickerson, Ph.D. (PI)

Agency: NASA

Period: 7/1/13–6/30/17

Amount of Award: \$750,000

*Investigation of host-pathogen interactions, conserved cellular responses, and countermeasure efficacy during spaceflight using the human surrogate model *Caenorhabditis elegans**

Cheryl A. Nickerson, Ph.D. (PI)

Agency: NASA

Period: 7/13/10–12/14/17

Amount of Award: \$1,354,000

RNA Seq Profiling of Microgravity-Induced Regulation of Salmonella infected nematodes

Cheryl A. Nickerson, Ph.D. (PI)

Agency: NASA

Period: 6/1/17–2/18/18

Amount of Award: \$95,680

Targeting Peyer's Patches to Improve Salmonella Typhi Vaccine Immunogenicity

Kenneth Roland, Ph.D. (PI); Cheryl A. Nickerson, Ph.D. (Co-I)

Agency: NIH (NIAID)

Period: 7/1/2015 - 6/30/2018

Amount of Award: \$1,500,000

Cheryl A. Nickerson, Ph.D.

Novel 3-D Model of Intestine to Study Mucus Penetration by Enteropathogenic E. coli

Cheryl A. Nickerson, Ph.D. (Co-PI); Neta Sal-Man, Ph.D. (Co-PI)

Agency: ASU-BGU (Ben-Gurion University in Israel) Projects in Health Sciences

Period: 9/1/2016-7/30/18

Amount of Award: \$40,000

Leica TCS SP8 Laser Scanning Confocal Microscope

Debra Baluch, Ph.D. (PI); Cheryl A. Nickerson, Ph.D. (Co-I)

Agency: NIH

Period: 3/15/2017-3/14/2019

Amount of Award: \$600,000

Enterovirus Infection of the Intestinal Epithelium

Carolyn Coyne, PI; Cheryl A. Nickerson, Ph.D. (Co-I)

Agency: NIH

R01 Competitive Renewal

Period: 10/1/13–2/28/19

Amount of Award: \$1,500,000

Developing predictive model systems of polymicrobial biofilm formation and susceptibility to chemical disinfectant: A longitudinal study with implications for spaceflight systems integrity and health risks

*Sloan Microbiome of the Built Environment (MoBE) Postdoctoral Fellowship

Award to Jiseon Yang

Cheryl A. Nickerson Ph.D. (PI)

Agency: Alfred P. Sloan Foundation

Period: 6/1/17-12/31/20

Amount of Award: \$140,000

Effects of Spaceflight Relevant Carbon Dioxide Levels on Pathogenesis Related Microbial Characteristics

Mark Ott, Ph.D. (PI); Cheryl A. Nickerson, Ph.D., (Consultant)

Agency: NASA

Period: 8/1/2021 - 7/31/2022

Amount of Award: \$102,277

High dimensional biology to understand the functional response of Salmonella to long-term multigenerational growth in the chronic stress of microgravity

Cheryl A. Nickerson, Ph.D. (PI)

Agency: NASA

Period: 8/15/2015-12/31/23

Amount of Award: \$2,656,533

Contributions of the microbiome in astronaut health

Cheryl A. Nickerson, Ph.D. (PI); Jennifer Barrila, Ph.D. (Co-PI)

Agency: NASA

Cheryl A. Nickerson, Ph.D.

Period: 8/1/2018 - 9/30/2024

Amount of Award: \$499,943

Effects of radiation and radiation countermeasures on infection

Cheryl A. Nickerson, Ph.D. (PI)

Agency: NASA

Period: 8/1/2021 - 4/27/2024

Amount of Award: \$150,000

Active Support

Polymicrobial biofilm growth and control during spaceflight

Robert McLean, Ph.D. (PI); Cheryl A. Nickerson, Ph.D. (Co-PI)

Agency: NASA

Period: 10/1/2016-8/31/25

Amount of Award: \$1,342,879

Spaceflight-Induced Changes in Microbial Virulence and the Impact to the Host Immune Response

Mark Ott, Ph.D. (Overall PI); Cheryl A. Nickerson, Ph.D. (PI, Arizona State University)

Agency: NASA

Period: 12/1/2019 - 11/30/2026

Amount of Award: \$2,173,000

Biofilm Inhibition with Germicidal Light Side-Emitted from Nano-enabled Flexible Optical Fibers in Water Systems

Paul Westerhoff, Ph.D., (PI); Cheryl A. Nickerson, Ph.D., (Co-PI); Jennifer Barrila, Ph.D. (Co-PI); Francois Perreault, Ph.D. (Co-PI)

Agency: NSF; NASA

Period: 10/1/2022 - 9/30/2025

Amount of Award: \$380,000

Effects of Lunar Dust Simulant on Human 3-D Biomimetic Intestinal Models, Enteric Microorganisms, and Infectious Disease Risks

Cheryl A. Nickerson, Ph.D. (PI)

Agency: NASA

Period: 1/1/2024 - 12/31/2025

Amount of Award: \$300,000

TEACHING EXPERIENCE

Teaching Assistant, University of Missouri, General Biology Lab. 1986-1988

Teaching Assistant, Louisiana State University, General Microbiology Lab and

Cheryl A. Nickerson, Ph.D.

Introductory Microbiology Lab. 1988-1993

Instructor, Molecular Biology Workshop for High School Science Teachers, supported by Howard Hughes Medical Institute. 1993

Instructor in the Medical Microbiology Laboratory for second year medical students at Washington University School of Medicine, St. Louis, MO, 1995

Instructor and coordinator in a three-credit course entitled "Modern Genetics", offered to students in the MA program at Washington University, St. Louis, MO, Spring semester, 1997

Instructor in the Medical Microbiology Course offered to second year medical students at Tulane University School of Medicine, 1998- spring 2006

Instructor and coordinator in a six-credit course entitled "*Genetics, Physiology, and Molecular Aspects of Microbial Pathogenesis*", offered to graduate students in the Dept. of Microbiology and Immunology at the Tulane University School of Medicine, Spring semester, 1999, 2001, 2003; Changed to a four-credit course in Fall semester 2004

Instructor in a three credit Microbiology laboratory course entitled "Advanced Bacteriology" (MIC 302) for undergraduate students at Arizona State University, Spring semester 2007, 2008

Instructor in a three-credit introductory Microbiology course (MIC 205) entitled "*Microbiology*" offered to undergraduate students at Arizona State University, Spring semester 2007, 2009, 2010, 2011, 2012, 2013; Fall semester 2007, 2008, 2009, 2010; Fall semester 2025

Instructor in a three-credit Microbiology course required for majors (MIC 220) entitled "*Biology of Microorganisms*" offered to undergraduate students at Arizona State University, Spring semester, 2011, 2014, 2016; Fall semester 2012, 2015, 2016, 2017, 2018

Instructor and Co-Developer for a four credit Microbiology course for graduate students and advanced undergraduates (MIC 494/598) entitled "*Novel Models for Infectious Disease Research*". *(Course title change to "*Novel Models for Host-Microbe Interactions*" in Spring 2016; Course title change to "*Novel Models of Infectious Disease*" in Fall 2024). Fall semester 2013, 2014; Spring semester 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023; Fall semester 2024; Spring semester 2025

Honors Disciplinary Faculty, Microbiology Senior Project Research Advisor (MIC 401) at Arizona State University, Spring semester 2007 - present

School of Life Sciences Undergraduate Research (SOLUR) program faculty mentor, 2013-present

Cheryl A. Nickerson, Ph.D.

Undergraduate research advisor and instructor (MIC 495) at Arizona State University, Spring semester 2007 - present

Participant in supporting *ASU Education Outreach* internship programs for high school students by mentoring student research in my lab, 2007- present

Instructor, 5 week Discussion Component of ASU BIO 189 to supplement ASU Freshman Success Seminars, Fall 2009, Fall 2012, Fall 2016

Invited Guest Lecturer, MIC 501, Foundations in Microbiology, Fall 2020, 2024

Instructor and Co-Developer, ASU Discovery Seminar Series for first year students, LIA194, “*Living in Space: Know Before Your Go*” that discusses the health risks of human spaceflight, and research being done to keep humans healthy and productive as they live, work, and travel in space, Spring 2023, 2024, 2025

STUDENTS AND POSTDOCTORAL FELLOWS TRAINED:

High school students trained:

- Alicia Johnson
- Shivani Kapur
- Andrew Sherrard
- Savana Kilbourne

Undergraduate students trained:

- Cynthia Mysinger
- Ashley Castillo
- Alana Waterford – M.D., Family Medicine Resident Physician, Texas Tech University Health Sciences Center
- Laura Quick – Senior Research Associate, Children’s Hospital of Philadelphia
- Nicole Neal
- Richard Davis - Senior Research Specialist in my laboratory
- Jacqueline McFarland
- Melissa Kelsey
- Kimberly Buck – Scientific and Engineering Recruiter, R&D Partners, San Francisco, CA
- Megan DeRoos
- Kristyn Staiger
- Laura Kosirog
- Rebecca Forsyth – Senior Research Specialist in my laboratory
- Amber Harris
- Travis Kelner
- Jason Perlman

- Cassie Choi - Graduate student, School of Pharmacy, Baylor College of Medicine
- Jesse Teer
- Joseph Spadafino – MPH, Dept of Epidemiology, Columbia University; currently an epidemiologist in the Department of Arizona Health Services
- Charlie Pajares – Ph.D. candidate, Dept of Immunology and Microbiology, University of Colorado, School of Medicine
- Sami Kaldawi – Resident Physician, Barrow Neurological Institute, Phoenix, AZ
- April Rideout - Research Technician, Barrow Neurological Institute, Phoenix, AZ
- Christopher Pierce Bradley – Graduated with a M.S. in Molecular Microbiology and Immunology from the Johns Hopkins Bloomberg School of Public Health; Graduated with a M.D. from the University of Arizona College of Medicine; *Currently Chief Resident in Internal Medicine at the University of Southern California.*
- Yulong Liu – Graduated with a Ph.D. from the Dept of Biochemistry, Molecular, Cellular and Developmental Biology, University of California, Davis; *Recipient of the UC Davis Dissertation Year Fellowship Award, 2020. Currently an R&D Scientist at the world's first cultivated meat company, Upside Foods.*
- Alexander Ellingson
- Breanne McCarthy – *Recipient of the 2015 ASU School of Life Sciences (SoLS) Undergraduate Research Scholarship Award. This award is given to a single student annually who has demonstrated the most exceptional research accomplishment(s) in SoLS. Graduated with her M.D. from the Johns Hopkins University School of Medicine. Currently an Internal Medicine Resident at the University of Pennsylvania.*
- Jana Gojic
- Ami Dave – Received a M.S. degree in my lab. Currently a Research Technician in the lab of Grant McFadden in the Biodesign Center for Immunotherapy, Vaccines and Virotherapy at ASU
- Keith Crenshaw – Received a M.S. degree in my lab. Received his DPM from the New York College of Podiatric Medicine. Currently a Medical Resident at the Harvard Medical School, Mount Auburn Hospital.
- Christian Castro – Received a M.S. degree in my lab, Currently a research scientist in the Microbiology Laboratory at the NASA Johnson Space Center
- Vu Nguyen – Dental student, Midwestern University
- Bianca Kang - *Recipient of a 2015 ASU School of Life Sciences Undergraduate Research (SOLUR) Program Summer Research Experience (SRE) Award. After graduation, Bianca was a Research Technician in my laboratory before attending medical school at the Creighton University School of Medicine. She is the recipient of a prestigious Dermatology Research Fellowship at Northwestern University Feinberg School of Medicine – only one fellowship per year is awarded. Currently a Resident in Dermatology at the Mayo Clinic in Phoenix, AZ.*
- Brendan Thomas
- Olivia King – Received a MS degree in my lab. Currently a Ph.D. graduate student at the Imperial College in London developing novel microbiome

therapeutics to restore intestinal homeostasis and mitigate enteric pathogen colonization.

- Andrew Truswell
- Jeffrey Zhao
- Sara Koroli – Former undergraduate student researcher and Research Technician in my lab. *Recipient of the 2019 and 2020 Dr. Harry Bilbert & Doris Loraine Crecelius Scholarship Award from the ASU School of Life Sciences (SoLS). Finalist for a Fulbright Scholarship, 2020; Microbiology Student of the Year Award from the ASU School of Life Sciences, 2020; Currently a medical student at the Creighton University School of Medicine.*
- Katherine Kocwazara
- Matthew Laff – Currently a medical student at Saint George's University School of Medicine.
- Christian Vu – Former undergraduate research student in my lab. *Currently an Extra Vehicular Activities (EVA) Operations Flight Controller, Integrated Mission Operations division of Barrios Technology in Houston, TX. In this position, Christian supports the NASA Flight Operations Directorate at the NASA Johnson Space Center in the planning, development, and integration of Astronaut EVAs (Extravehicular Activities).*
- Rashmi Sethi - Former undergraduate research student in my lab, currently a medical student at Midwestern University Arizona College of Osteopathic Medicine
- Haniyah Syed – Currently a medical student at Midwestern University
- Jeremy Duncan – Currently an undergraduate research student in my lab
- Emme Velasco – Currently an undergraduate research student in my lab
- Chloe Rozalsky - Currently an undergraduate research student in my lab. *Selected by SoLS as a SOLUR undergraduate researcher, 2024; selected by ASU as a nominee for a prestigious Barry Goldwater Scholarship, 2024; Recipient of the Barry Goldwater Scholarship Award, 2025. This Scholarship is widely considered the most prestigious award in the U.S. conferred upon undergraduates studying the sciences.*
- Julissa Brunk - Currently an undergraduate research student in my lab
- Brooklyn Harvey
- Ava Crane – Currently an undergraduate research student in my lab

Graduate students trained:

- Taylor Ranson – currently a Ph.D. student in my lab
- Kaitlyn Daugherty - currently a Ph.D. student in my lab
- Molly Feldner – currently a Ph.D. student in my lab
- Laura Banken – received her M.S. degree in my lab.
- Antonio Bando – completed a Ph.D. research rotation in my lab
- Olivia King – received her M.S. degree in my lab. *Received her Ph.D. in the Department of Infectious Diseases at the Imperial College in London. Her doctoral dissertation research was focused on developing novel microbiome therapeutics to restore intestinal homeostasis and mitigate enteric pathogen*

- colonization. She has accepted a Postdoctoral position as Associate Researcher at the Imperial College in London to continue these studies.*
- Karla Franco – received her Ph.D. in my lab. *Recipient of the ASU School of Life Sciences (SoLS) Teaching Excellence and Innovation Award, 2019; Recipient of the 2020 Teaching Excellence Award from the Graduate and Professional Student Association at ASU. Currently a Postdoctoral fellow in Computational Bioinformatics at the University of Florida.*
 - Christian Castro – received a M.S. degree in my lab. *Currently a Research Scientist in the Microbiology Laboratory at the NASA Johnson Space Center*
 - Keith Crenshaw – received a M.S. degree in my lab. *Received his DPM from the New York College of Podiatric Medicine. Currently a Medical Resident at the Harvard Medical School, Mount Auburn Hospital.*
 - Ami Dave – received a M.S. degree in my lab. *Currently a Research Technician and Lab Operations Manager in the lab of Dr. Grant McFadden, Director of the Biodesign Center for Immunotherapy, Vaccines and Virotherapy at ASU*
 - Jiseon Yang – received her Ph.D. in my lab. *Recipient of the ASU School of Life Sciences (SoLS) Outstanding Teaching Associate of the Year, 2014; Recipient of three SOLS Graduate Research Scholarships to fund a portion of her dissertation research in 2012, 2013, 2014. Recipient of a 2017 Alfred P. Sloan Postdoctoral Fellowship Award. Nominated for the 2020 Thora Halstead Young Investigator Award from the American Society for Space and Gravitational Research (ASGSR). Currently an Assistant Research Professor in the Center for Fundamental and Applied Microbiomics, the Biodesign Institute at Arizona State University.*
 - Viola Sanderlin – Ph.D. graduate student rotation in my lab.
 - Maria Ledesma Barrera, received her M.S. degree in my lab. *Currently an Instructor, ASU School of Life Sciences*
 - Rosemarie DeWeirdt - *Postdoctoral fellow at the Laboratory of Microbial Ecology and Technology (LabMET) - Ghent University, Belgium. Currently a Researcher in the Department of Biochemistry and Microbiology, Ghent University, Belgium*
 - Aurélie Crabbé – *Recipient of a 2007 Henri Benedictus Fellowship awarded by the King Baudouin Foundation and the Belgian American Educational Foundation to conduct a portion of her PhD dissertation research in my laboratory; Recipient of an Odysseus fellowship senior researcher at the Laboratory of Pharmaceutical Microbiology, Ghent University, Belgium. Currently Associate Professor of Microbiology, Laboratory of Pharmaceutical Microbiology, Ghent University, Belgium*
 - Emily Richter – *Recipient of a 2008 NASA Graduate Student Research Program Fellowship award to fund a portion of her dissertation research.*
 - Clint Coleman - *Recipient of a 2005 NASA Graduate Student Research Program Fellowship award to fund a portion of his dissertation research.*
 - Chassidy Johnson – Ph.D. graduate student rotation in my lab. *Currently Associate Director Scientific Collaborations, Cancer Immunology Team at IsoPlexis*
 - Sarah Mister - Ph.D. graduate student rotation in my lab

Graduate student Committee member:

- Lexi Yakimovich - (Arizona State University)
- Emma Henderson - (Arizona State University)
- Nikki Johnston - (Oregon State University)
- Daniela Gutierrez-Munoz - (Arizona State University)
- Cole Calderon - (Arizona State University)
- Tangsiyuan Hua - (Arizona State University)
- Yannik Haller - (Arizona State University)
- Roslyn Dermody - (Arizona State University)
- Starla Thornhill (Texas State University)
- Ryan LaMarca - (Arizona State University)
- Karla Franco - (Arizona State University)
- Dana Woell – (Arizona State University)
- Emily Julik – (Arizona State University)
- Cori Leonetti (Arizona State University)
- Natasha Weatherspoon (Arizona State University)
- Aurélie Crabbé (Ghent University, Belgium)
- Sarah Castro (University of Texas Medical Branch, Galveston)
- Alix Meyers (Tulane University School of Medicine)
- Gillian Olson (Tulane University School of Medicine)
- Alex Carterson (Tulane University School of Medicine)
- James McCracken (Tulane University School of Medicine)
- William Uicker (Tulane University School of Medicine)
- Steven Lizewski (Tulane University School of Medicine)
- Sarah Mister (Tulane University School of Medicine)

Postdoctoral researchers trained:

- James Wilson - Associate Professor, Department of Biology, Villanova University, Villanova, PA.
- Kerstin Höner zu Bentrup - Associate Professor, Department of Microbiology and Immunology, Tulane University School of Medicine, New Orleans, LA.
- Amy Smith (formerly Amy Zuppardo) - Regulatory Global Lead for DuPont Probiotics, DuPont Nutrition and Health. Vice-President, International Probiotics Association.
- Jiseon Yang – Assistant Research Professor, Center for Fundamental and Applied Microbiomics, the Biodesign Institute at Arizona State University. *Recipient of a 2017 Alfred P. Sloan Postdoctoral Fellowship Award. Nominated for the 2020 Thora Halstead Young Investigator Award from the American Society for Space and Gravitational Research (ASGSR).*
- Jennifer Barrila – Assistant Research Professor, Center for Fundamental and Applied Microbiomics, the Biodesign Institute at Arizona State University. *Recipient of the 2014 Thora Halstead Young Investigator Award from the American Society for Space and Gravitational Research (ASGSR). This is ASGSR's highest honor given annually to a young scientist who has made*

significant contributions to the field of gravitational and space research. Recipient of the Presidential Early Career Award for Scientists and Engineers (PECASE) from NASA, 2015. This is the highest honor bestowed by the U.S. government on science and engineering professionals in the early stages of their independent research careers.

- Aurélie Crabbé – Assistant Professor of Microbiology, Faculty of Pharmaceutical Sciences, Ghent University, Belgium. *Odysseus Fellowship recipient from the Fund for Scientific Research Flanders to initiate her own research line at Ghent University, Belgium.*
- Andrea Throop (formerly Andrea Radtke) – Vice President, Laboratory Operations, LabCorp
- Shameema Sarker – Medical writer, Merz Pharmaceuticals
- Seth Nydam – Clinical Veterinarian, Department of Animal Care and Technologies, Arizona State University

POSTER PRESENTATIONS

Nickerson, C.A., and P. Agris. Structure-function effects on the *Escherichia coli* tRNA Gln₂ molecule. tRNA International Symposium, Umea, Sweden, August, 1987

Stemke, D.J., Nickerson, C.A., and E.C. Achberger. **Transcriptional studies with promoters containing curved DNA using RNA polymerase from *Escherichia coli* and *Bacillus subtilis*.** American Society for Microbiology, General Meeting, New Orleans, Louisiana, May, 1992

Nickerson, C.A., and E.C. Achberger. Role of Curved DNA in Promoter Recognition with *Bacillus subtilis* and *Escherichia coli* RNA polymerase. American Society for Microbiology, General Meeting, Atlanta, Georgia, May, 1993

Nickerson, C.A., and R. Curtiss III. Effect of an *rpoS* Mutation on the Adherence and Invasion of *S. typhimurium*. American Society for Microbiology, General Meeting, Washington, D.C. May 1995

Nickerson, C.A., and R. Curtiss III. An *rpoS* Mutant of *S. typhimurium* is Defective in the Initial Stages of Colonization and is Immunogenic in Mice. American Society for Microbiology, General Meeting, New Orleans, Louisiana, May 1996

Burns-Keliher, L., and C. A. Nickerson. **Tissue specific proteins synthesized by *Salmonella typhimurium*.** American Society for Microbiology, General Meeting, New Orleans, Louisiana, May 1996

Navis, C.J., C.A. Nickerson, M.R. Wilmes-Riesenberg, and R. Curtiss III. **Construction of *Salmonella typhimurium* Strains Containing Mutations in One or More Adhesins and their Effect on Virulence.** American Society for Microbiology, General Meeting, Atlanta, Georgia, May 1998

Cheryl A. Nickerson, Ph.D.

Nickerson, C.A., Zhang, X, Bollen, W, and R. Curtiss III. Immunogenic, Attenuated *Salmonella* Having an RpoS Positive Phenotype as Candidates for Live Oral Vaccines. American Society for Microbiology, General Meeting, Chicago, Illinois, June 1999

Zhang, X, **Nickerson, C.A.**, Bollen, W, and R. Curtiss III. American Society for Microbiology, General Meeting, Los Angeles, CA, June 2000

Dozois, C.M., Brown, P.K., **Nickerson, C. A.**, and R. Curtiss III. ***mlrA*, a Positive Transcriptional Regulator of Curli/Agf Synthesis in Avian Pathogenic *Escherichia coli* (APEC) and *Salmonella typhimurium*.** American Society for Microbiology, General Meeting, Los Angeles, CA, June 2000

Nickerson, C.A., Goodwin, T.J., Terlonge, J., Ott, C.M., Buchanan, K.L., Uicker, W.B., Emami, K., Cedor, C.L., Ramamurthy, R., Hammond, T., and D L. Pierson. **Novel Tissue Assemblies: Models for Enteric Pathogenesis.** American Society for Microbiology, General Meeting, Orlando, FLA, May 2001

Navis, C.J., M.R. Wilmes-Riesenberg, **C.A. Nickerson**, and R. Curtiss III. **Analysis of *S. typhimurium* mutants lacking flagella and fimbriae with respect to their ability to attach to and invade cells in culture and their virulence in mice.** American Society for Microbiology, General Meeting, Orlando, FLA, May 2001

A. J. Carterson, C. M. Ott, M. S. Clarke, C. R. Vanderburg, **C. A. Nickerson**, M. J. Schurr. **A Novel Model for *Pseudomonas aeruginosa* Adhesion to Lung Epithelia.** American Society for Microbiology, General Meeting, Salt Lake City, Utah 2002

A.J. Carterson, C. M. Ott, M. S. Clarke, C. R. Vanderburg, **C. A. Nickerson**, M. J. Schurr. **A549 lung epithelial cells grown as 3-D aggregates: Alternative tissue culture model for *P. aeruginosa* pathogenesis.** American Society for Microbiology, General Meeting, Washington, D.C. 2003

J. McClure Blackmer, J. Liford, W. Henk, O. Borkhsenius, D. Paccamonti, R. Moore, C. LeBlanc, **C. Nickerson.** **Development of three-dimensional tissue assemblies of equine fetal tracheal cells (EFTR) under microgravity conditions.** American College of Veterinary Internal Medicine meeting, June, 2003

J. McClure Blackmer, J. Liford, W. Henk, O. Borkhsenius, D. Paccamonti, R. Moore, C. LeBlanc, **C. Nickerson.** **Development of three-dimensional tissue assemblies of equine fetal laminar cells under microgravity conditions.** American College of Veterinary Internal Medicine meeting, June, 2003

H. L. LaMarca, C. M. Ott, K. Höner zu Bentrup, C. L. LeBlanc, D.L. Pierson, **C. A. Nickerson**, A. B. Nelson, and C. A. Morris. **A Novel Three-Dimensional Model of Human Placentation for the Study of Human Cytomegalovirus Pathogenesis.** Tulane

Cheryl A. Nickerson, Ph.D.

Annual Research Days. April 2003

A. Myers, **C. Nickerson**, C. M. Ott, D. Pierson, and Mario T. Philipp. **A Novel 3-Dimensional Cell Culture Approach for Studying Pathogenesis in Lyme Neuroborreliosis.** Tulane Annual Research Days. April 2004

R. Ramamurthy, K. Höner zu Bentrup, C. M. Ott, S. Alexander, K. Emami, M. Nelman-Gonzalez, T. Goodwin, D. Pierson, Neal R. Pellis, and **C.A. Nickerson.** **Three-Dimensional Cell Culture Provides Physiologically Relevant Models of Human Colonic Epithelium for the Study of *Salmonella* Pathogenesis.** American Society for Microbiology, General Meeting, New Orleans, LA. 2004

J.W. Wilson, C. Coleman, D.H. Figurski, and **C.A. Nickerson.** **VEX-Capture: A Novel Procedure for the Targeted Excision, Cloning and Broad-Host-Range Transfer of Large Bacterial Genomic Segments and its Use to Study Genomic Islands.** American Society for Microbiology, General Meeting, New Orleans, LA. 2004

H. L. LaMarca, C. M. Ott, C.L. LeBlanc, A.B. Nelson, K. Höner zu Bentrup, D. L. Pierson, G. St J. Whitley, **C. A. Nickerson**, and C. A. Morris. **Three-dimensional growth of extravillous cytotrophoblasts promotes differentiation and invasion.** Reproductive Tract Biology - Gordon Research Conference. New London, Connecticut , June 6-11, 2004

T.A. Myers, **C.A. Nickerson**, K Honer zu Bentrup, M. Philipp. **Closing the Phenotypic Gap between Transformed Neuronal Cell Lines in Culture and Untransformed Neurons.** FASEB/Experimental Biology Meeting, Washington D.C., April 28 - May, 2007

D. Wunschel, T. Straub, R. Bartholomew, J. Wahl, H. Edberg, C. Valdez, J. Small, N. Beagley, A. Willse, and **C. Nickerson.** **Detecting and comparing markers of response to infection: Tools to evaluate response independent of host model system.** American Society for Microbiology (ASM) Biodefense meetings, Baltimore, MD, February 24-27, 2007

C. Valdez, T. Straub, R. Bartholomew, **C. Nickerson**, N. Valentine, and H. Kreuzer. **Host-pathogen biosignature discovery in infected 3-dimensional cell cultures.** American Society for Microbiology (ASM), General Meeting, Toronto, Canada, May 20-24, 2007

T. Straub, R. Bartholomew, J. Wahl, D. Wunschel, H. Edberg, E. Richter, D. Fernandez, and **C. Nickerson.** **In vitro replication of human noroviruses and host response observed in a 3-D model of small intestinal epithelium.** Third International Calicivirus Conference, Cancun, Mexico, November 10-13, 2007

M. Herbst-Kralovetz, B. Hjelm, T. Straub, E. Richter, C. Arntzen, and **C. Nickerson.** **Development of a virus neutralization assay for evaluation/screen of human**

Cheryl A. Nickerson, Ph.D.

norovirus vaccine. Third International Calicivirus Conference, Cancun, Mexico, Nov. 10-13, 2007

J.W. Wilson, C.M. Ott, K. Höner zu Bentrup, R. Ramamurthy, L. Quick, S. Porwollik, P. Cheng, M. McClelland, G. Tsaprailis, T. Radabaugh, A. Hunt, D. Fernandez, E. Richter, M. Shah, M. Kilcoyne, L. Joshi, M. Nelman-Gonzalez, S. Hing, M. Parra, P. Dumars, K. Norwood, R. Bober, J. Devich, A. Ruggles, C. Goulart, M. Rupert, L. Stodieck, P. Stafford, L. Catella, M.J. Schurr, K. Buchanan, L. Morici, J. McCracken, P. Allen, C. Baker-Coleman, T. Hammond, J. Vogel, R. Nelson, D.L. Pierson, H.M. Stefanyshyn-Piper, and **C.A. Nickerson.** 2007. **Spaceflight alters bacterial gene expression and virulence and reveals role for global regulator Hfq.** Integrated Biosystems Research Symposium, Arizona Proteomics Alliance, Arizona State University, November 16, 2007

Hjelm, B., Berta, A., **Nickerson, C.**, Arntzen, C. and M.M. Herbst-Kralovetz. 2008. **Development of a 3-D Model of Human Vaginal Epithelia for Microbicide Screening.** 7th Arizona Biosciences Leadership Symposium: Translational Medicine, Tucson, AZ

Hjelm, B., Berta, A., **Nickerson, C.**, Arntzen, C. and M.M. Herbst-Kralovetz. 2008. **Development and Characterization of a 3-D Model of Human Vaginal Epithelia for Microbicide Screening.** IAB meeting, Oct, 2008. The Biodesign Institute, Tempe, AZ

Sarker, S., Davis, R., Forsyth, R., Curtiss III, R., and **C.A. Nickerson.** 2008. **Spaceflight and Spaceflight Analogue Platforms for Innovative Vaccine Methodology.** IAB meeting, The Biodesign Institute, Tempe, AZ

J. Cohen, D. Niesel, B. Pyle, M. McGinnis and **C.A. Nickerson.** 2009. **Microbial Drug Resistance and Virulence. Gravity-Related Phenomena in Space Exploration Symposium,** January 5-7 in Orlando, FL, 2009

Kapur, S., Forsyth, R., Barrila, J., and **C.A. Nickerson.** 2009. **Role of media ion composition in regulating the Hfq mediated acid stress of *Salmonella* during spaceflight analogue culture** – Arizona High School Science Fair, Phoenix, AZ, March 23, 2009

M. Herbst-Kralovetz , Hjelm, B., Lay, M., S. Sarker, Berta, A., Atmar, R., Arntzen, C., Estes, M., and **C.A. Nickerson.** **Lack of Success in Culturing Noroviruses in 3-D Culture Systems.** Vaccines for Enteric Diseases (VED) International Meeting. Benalmadina, Malaga, Spain. September 9-11, 2009

M. Herbst-Kralovetz , Hjelm, B., Lay, M., S. Sarker, Radtke, A., Berta, A., Atmar, R., Arntzen, C., Estes, M., and **C.A. Nickerson.** 2010. NRI/AFRI Project Directors' Meeting for the NRI/AFRI Food Safety Programs, Chicago, IL, July 16-17, 2010

M. Herbst-Kralovetz , Hjelm, B., Lay, M., S. Sarker, Radtke, A., Berta, A., Atmar, R.,

Cheryl A. Nickerson, Ph.D.

Arntzen, C., Estes, M., and **C.A. Nickerson**. 2010. NRI/AFRI Project Directors' Meeting for the NRI/AFRI Food Safety Programs, Milwaukee, WI, July 16-17, 2011

A.L. Radtke, N. Emmert, K. Abraham, **C.A. Nickerson**, M.M. Herbst-Kralovetz. 2011. **Role of Mucins in Limiting HSV-2 Infection in an Organotypic Human Vaginal Epithelial Model**. American Society for Microbiology (ASM), General Meeting, San Diego, California, May 23-27, 2011

Castro S.L., Nelman-Gonzalez M., **Nickerson C.A.**, Ott, C.M. 2011. **Low Fluid Shear Culture of *Staphylococcus aureus* Represses *hfq* Expression and Induces an Attachment-Independent Biofilm Phenotype**. Society for Microbiology (ASM), General Meeting, San Diego, California, May 23-27, 2011

Jennifer Barrila, Rebecca Forsyth, Richard Davis, James Wilson, Shameema Sarker, Aurelie Crabbe, C. Mark Ott, Kenneth L. Roland, Amanda Gonzales, Jacquelyn Kilbourne, Karen Brenneman, Roy Curtiss III, Nicole Hansmeier, Rolf Halden, Alexander Zaborin, Olga Zaborina, John C. Alverdy, and **Cheryl A. Nickerson**. **Using Spaceflight and Spaceflight Analogue Culture to Advance Human Health**, Center for Infectious Diseases and Vaccinology Open House, The Biodesign Institute, ASU, 2012

Jiseon Yang, Jennifer Barrila, C. Mark Ott, Kenneth L. Roland, Roy Curtiss III and **Cheryl A. Nickerson**. **Characterization of Invasive Multidrug Resistant *Salmonella enterica* serovar Typhimurium ST313 D23580 in Response to Physiological Fluid Shear**. Center for Infectious Diseases and Vaccinology Open House, The Biodesign Institute, ASU, 2012

April Rideout, Jennifer Barrila, Pierce Bradley, Joseph Spadafino, Rebecca Forsyth, Richard Davis C. Mark Ott, and **Cheryl A. Nickerson**. **Response of *Salmonella bongori* to Physiological Low Fluid Shear Culture**, ASU School of Life Sciences Undergraduate Research Symposium, ASU, 2013

Aur lie Crabb , Shameema F. Sarker, Nicholas R. Bonenfant, Yulong Liu, Jennifer Barrila, Jenny Pattengill, James J. Lee, Daniel J. Weiss, and **Cheryl A. Nickerson**. **Improved recellularization efficiency and cell health in decellularized lung scaffolds using a low fluid shear bioreactor system**. [SEP]Stem Cells and Cell Therapies in Lung Biology and Lung Diseases Conference, Burlington, VT, July 29-Aug, 1, 2013

Harris KG, Drummond C, Morosky SA, **Nickerson CA**, and Coyne C. **Coxsackievirus B3 cleaves Receptor-Interacting Protein Kinase 3 (RIP3) to alter host cell death and toll-like receptor signaling**. The Ins and Outs of Viral Infection, Keystone Symposium, Beaver Run Resort, Breckenridge, CO, March 30-Apr 4, 2014

Sarah L. Castro, **Cheryl A. Nickerson**, C. Mark Ott, Rebecca J. Forsyth, April Rideout, John C. Alverdy, and Jennifer Barrila. **Evaluating the Spaceflight Infectious Disease Risk Potential of Pathogenic and Commensal microorganisms using *Caenorhabditis***

Cheryl A. Nickerson, Ph.D.

***elegans* as a Human Surrogate Model for Infection.** 2014. Human Research Program Investigators' Workshop, Galveston, TX

Cheryl A. Nickerson, Virginia E. Wotring, Jennifer Barrila, Aurélie Crabbé, Sarah L. Castro, Richard Davis, April Rideout, Breanne McCarthy, and C. Mark Ott. **Efficacy of Antimicrobials on Bacteria Cultured in a Spaceflight Analogue.** 2014. Human Research Program Investigators' Workshop, Galveston, TX

Breanne McCarthy, Jennifer Barrila, April Rideout, Rebecca J. Forsyth, Richard Davis, Sarah L. Castro, C. Mark Ott, and **Cheryl A. Nickerson.** **LSMMG-conditioned Medium Modulates the Response of *Salmonella enterica* serovar Typhimurium to Physiological Fluid Shear.** 2014. ASU School of Life Sciences Undergraduate Research Symposium, Tempe, AZ

Jennifer Barrila, Aurélie Crabbé, Jiseon Yang*, Shameema F. Sarker, C. Mark Ott, Yulong Liu, Brian Crucian, Mayra Nelman-Gonzales, Heather Quiriarte, Karen Brenneman, Clarence Sams, and **Cheryl A. Nickerson.** **Three-Dimensional Co-Culture Model of Intestinal Epithelium and Macrophages Reveals Altered Colonization Profiles of *Salmonella* Pathovars.** 2014. Center for Infectious Diseases and Vaccinology After Hours, The Biodesign Institute, Tempe, AZ

Jiseon Yang, Jennifer Barrila, C. Mark Ott, Kenneth L. Roland, Jacqueline Kilbourne, Rebecca Forsyth, Jin Park, Jason Steel, Joshua LaBaer, Roy Curtiss III and **Cheryl A. Nickerson.** ***Salmonella* Typhimurium ST313 D23580: Characterizing the Impact of Traditional and Low Fluid Shear Culture Conditions on Virulence and Pathogenesis-Related Responses.** 2014. Center for Infectious Diseases and Vaccinology After Hours, The Biodesign Institute, Tempe, AZ

Jennifer Barrila, C. Mark Ott, Rebecca J. Forsyth, Richard Davis, James W. Wilson, and **Cheryl A. Nickerson.** **Experimental Considerations for the Proper Assessment of Spaceflight-induced alterations in Microbial Virulence.** 2014. Annual Meeting of the American Society for Gravitational and Space Research (ASGSR), Pasadena, CA

Jennifer Barrila, Shameema F. Sarker, Nicole Hansmeier, Natalia Briones, Jin Park, C. Mark Ott, Kevin Sato, Nicole Rayl, Jason Steel, Cris Kosnik, Anthony Yang, Diana Ly, Cheryl Shimoda, Tom Cannon, Richard Davis, Rebecca J. Forsyth, Sarah Castro, Aaron Landenberger, Camila Montano, Mitch Magee, Rolf Halden, Joshua LaBaer, and **Cheryl A. Nickerson.** **Microgravity Uniquely Alters the Host-Pathogen Interaction Between Human Intestinal Epithelial Cells and *Salmonella enterica* serovar Typhimurium.** 115th General Meeting of the American Society for Microbiology (ASM), New Orleans, LA. May 30-June 2, 2015

Jiseon Yang, Jennifer Barrila, Kenneth L. Roland, Jacquelyn Kilbourne, C. Mark Ott, Rebecca J. Forsyth, and **Cheryl A. Nickerson.** **Characterization of the Invasive, Multidrug Resistant Non-typhoidal *Salmonella* Strain D23580 in a Murine Model of Infection.** 115th General Meeting of the American Society for Microbiology (ASM), New

Cheryl A. Nickerson, Ph.D.

Orleans, LA. May 30-June 2, 2015

Jiseon Yang, Aurélie Crabbé, Shameema F. Sarker, Jennifer Barrila, Brian E. Crucian, Mayra A. Nelman-Gonzales, Heather Quiriarte, Karen Brenneman, Clarence Sams, C. Mark Ott, and **Cheryl A. Nickerson. Three-dimensional Co-culture Model of Intestinal Epithelial Cells and Macrophages Reveals Altered Colonization Profiles of *Salmonella* Pathovars.** 115th General Meeting of the American Society for Microbiology (ASM), New Orleans, LA. May 30-June 2, 2015

Aurélie Crabbé, Yulong Liu, César de La Fuente-Núñez, Richard Davis, Sisouk Phrasavath, Maria A. Ledesma, Rob Van Houdt, Tom Coenye, Robert E.W. Hancock, and **Cheryl A. Nickerson. *Pseudomonas aeruginosa* co-cultured with three-dimensional lung epithelial cells exerts decreased susceptibility to antimicrobial agents.** ASM Conference on *Pseudomonas*. Washington, D.C., Sept 8-12, 2015

Christian Castro, Jiseon Yang, Jennifer Barrila, Ami Gutierrez-Jensen, C. Mark Ott and **Cheryl A. Nickerson. Physiological Low Fluid Shear Stress Alters the Pathogenesis-Related Phenotype of the Invasive Multidrug Resistant Nontyphoidal ST313 strain 5579.** School of Life Sciences. Microbiology Graduate Program Poster series, ASU, Tempe, AZ. October, 2015

Keith Crenshaw, Jiseon Yang, Jennifer Barrila, C. Mark Ott, and **Cheryl A. Nickerson. Low Shear Modeled Microgravity Regulates the *Salmonella* Typhimurium Acid Stress Response Independent of RpoS During Stationary Phase.** School of Life Sciences. Microbiology Graduate Program Poster series, ASU, Tempe, AZ. October, 2015

Ami Gutierrez-Jensen, Jiseon Yang, Jennifer Barrila, Christian Castro, Keith Crenshaw C. Mark Ott, and **Cheryl A. Nickerson. The Effect of Fluid Shear on Pathogenesis-Related Phenotypes of Non-typhoidal *Salmonella enterica* Serovar Typhimurium ST313 A130.** School of Life Sciences. Microbiology Graduate Program Poster series, ASU, Tempe, AZ. October, 2015

Christian Castro, Jiseon Yang, Jennifer Barrila, Ami Gutierrez-Jensen, C. Mark Ott and **Cheryl A. Nickerson. Physiological Low Fluid Shear Stress Alters the Pathogenesis-Related Phenotype of the Invasive Multidrug Resistant Nontyphoidal ST313 strain 5579.** *Jumpstarting STEM Careers Conference*, Association for Women in Science, Arizona Chapter, Jan 15, 2016

Keith Crenshaw, Jiseon Yang, Jennifer Barrila, C. Mark Ott, and **Cheryl A. Nickerson. Low Shear Modeled Microgravity Regulates the *Salmonella* Typhimurium Acid Stress Response Independent of RpoS During Stationary Phase.** *Jumpstarting STEM Careers Conference*, Association for Women in Science, Arizona Chapter, Jan 15, 2016

Ami Gutierrez-Jensen, Jiseon Yang, Jennifer Barrila, Christian Castro, Keith Crenshaw

Cheryl A. Nickerson, Ph.D.

C. Mark Ott, and Cheryl A. Nickerson. **The Effect of Fluid Shear on Pathogenesis-Related Phenotypes of Non-typhoidal *Salmonella enterica* Serovar Typhimurium ST313 A130.** *Jumpstarting STEM Careers Conference*, Association for Women in Science, Arizona Chapter, Jan 15, 2016

Aurélie Crabbé, Yulong Liu, César de La Fuente-Núñez, Richard Davis, Sisouk Phrasavath, Maria A. Ledesma, Shameema Sarker, Rob Van Houdt, Tom Coenye, Robert E.W. Hancock, and Cheryl A. Nickerson. **Altered susceptibility of *Pseudomonas aeruginosa* to antimicrobial agents when co-cultured with three-dimensional lung epithelial cells.** Cystic Fibrosis European Young Investigators Meeting, Paris, France, Feb 10-12, 2016

Dussik, C.M., A. Grozic, M. Hockley, L. Zhang, J. Park, J. Wang, C.A. Nickerson, S. Yale, A. Foxx-Orenstein, T. Sandrin, and P.W. Jurutka. **Characterization of Vitamin D and Serotonin Pathway Variations in Patients with Irritable Bowel Syndrome.** 2016. American Society for Biochemistry and Molecular Biology (ASBMB) meeting, San Diego, CA. April 2-6, 2016

Jiseon Yang, Jennifer Barrila, Aurélie Crabbé, Shameema F. Sarker, Brian E. Crucian, Mayra A. Nelman-Gonzales, Heather Quiriarte, Karen Brenneman, Clarence Sams, C. Mark Ott, and Cheryl A. Nickerson. **Three-dimensional Co-culture Model of Intestinal Epithelial Cells and Macrophages Reveals Altered Colonization Profiles of *Salmonella* Pathovars.** Biodesign Fusion Retreat, Carefree, AZ, April 1, 2016

Christian Castro, Jiseon Yang, Jennifer Barrila, C.M. Ott, and C.A. Nickerson. **Fluid Shear Force Regulates the Pathogenesis-Related Stress Responses of Invasive Multidrug Resistant *Salmonella* Typhimurium 5579.** Biodesign Fusion Retreat, Carefree, AZ, April 1, 2016

Christopher M Dussik, Aleksandra Grozić, Maryam Hockley, Lin Zhang, Jin Park, Jie Wang, Cheryl A. Nickerson, Steven H Yale, Amy Foxx-Orenstein, Todd Sandrin and Peter Jurutka. **Characterization of Vitamin D and Serotonin Pathway Variations in Patients with Irritable Bowel Syndrome.** Experimental Biology Meeting, San Diego, CA, April 2-6, 2016

Jiseon Yang, Jennifer Barrila, Aurélie Crabbé, Shameema F. Sarker, Brian E. Crucian, Mayra A. Nelman-Gonzales, Heather Quiriarte, Karen Brenneman, Clarence Sams, C. Mark Ott, and Cheryl A. Nickerson. **Three-dimensional Organotypic Co-culture Model of Intestinal Epithelial Cells and Macrophages to Study *Salmonella enterica* Colonization Patterns.** American Society for Microbiology (ASM)/American Society for Virology (ASV) Conference on Interplay of Viral and Bacterial Pathogens, Bethesda, MD, May 1-4, 2017

Barrila J, Yang J, Forsyth RJ, Gangaraju S, Ott CM, and Nickerson CA. **Three-Dimensional Tissue Culture Models: Next Generation Predictive Preclinical Platforms**

Cheryl A. Nickerson, Ph.D.

for Human Health and Disease. Arizona Wellbeing Commons, Tempe Center for the Arts, Tempe, AZ, Sept 6, 2017

George T. Noutsios, Aleksandra Grozić, Christopher M. Dussik, Jennifer Barrila, Seth Nydam, Amy E. Foxx-Orenstein, **Cheryl A. Nickerson**, Todd R. Sandrin and Peter W. Jurutka. **Investigating the Gut Microbiome Effect in Irritable Bowel Syndrome with a Novel Three-dimensional Model of Human Intestinal Epithelium.** Annual Meeting of Arizona/Southern Nevada Branch of the American Society for Microbiology (ASM) - Regional meeting, University of Nevada Las Vegas, April 21, 2018

Yang J, Barrila J, Forsyth RJ, f N, Gangaraju S, Ott CM, **Nickerson CA.** Three-Dimensional Tissue Culture Models: **Next Generation Predictive Preclinical Platforms for Human Health and Disease.** Synthetic Biology, Engineering, Evolution, and Design (SEED) Conference, Scottsdale, AZ, June 3-7, 2018

Yang J, Barrila J, King O, Bruce R, Ott CM, McLean R, and **Nickerson CA.** Multidrug resistant microbial consortia isolated from International Space Station (ISS) potable water: **Multi-species interactions, biofilm formation, metabolic characteristics, and hemolytic subpopulations.** Microbiome of the Built Environment (MoBE), Gordon Research Conference, Biddeford, ME, July 15-20, 2018

Yang J, Barrila J, King O, Bruce R, Ott CM, McLean R, and **Nickerson CA.** **Multidrug resistant microbial consortia isolated from International Space Station (ISS) potable water: Multi-species interactions, biofilm formation, metabolic characteristics, and hemolytic subpopulations.** ASM Biofilm Conference, Washington, D.C, Oct 7-11, 2018

Starla G. Thornhill, Jiseon Yang, Jennifer Barrila, Cheryl A. Nickerson, C. M. Ott, Robert J. C. McLean. **Planning a Microbiological Experiment for the International Space Station.** Texas ASM Branch Meeting, Corpus Christie, TX, Nov 8-10, 2018

J. Barrila, J. Yang, K. Franco, S. Yang, T. Davis, B.J. Aronow, H. Bean, R.R. Davis¹, R.J. Forsyth, C.M. Ott, S. Gangaraju, B. Kang, B. Hanratty, S.D. Nydam, W. Kong¹, J. Steel, and **C.A. Nickerson.** **Dynamic low fluid shear suspension culture enhances the host-pathogen interaction between *Salmonella* and a human 3-D intestinal co-culture model,** 3D Tissue Infection Symposium, Wuerzburg, Germany, April 5-7, 2019

K. Franco, K. Crenshaw, J. Yang, J. Barrila, C. M Ott, and **C.A. Nickerson.** **Mechanobiology of Stationary Phase Stress Responses in *Salmonella* Typhimurium is Largely Independent of RpoS under Physiological Fluid Shear Conditions.** Arizona-Southern Nevada Branch Meeting of the American Society for Microbiology (ASM), Flagstaff, AZ. April, 2019

Jiseon Yang, Jennifer Barrila, C. Mark Ott, Olivia King, Rebekah Bruce, Robert McLean, **Cheryl A. Nickerson.** **Multispecies interactions and hemolytic subpopulations of biofilm-forming microbiota recovered from spaceflight potable water.** General

Cheryl A. Nickerson, Ph.D.

Meeting of the American Society for Microbiology (ASM), San Francisco, CA. June 20-24, 2019

K. Franco, K. Crenshaw, J. Yang, J. Barrila, C. M Ott, and C.A. Nickerson.
Mechanobiology of Stationary Phase Stress Responses in *Salmonella* Typhimurium is Largely Independent of RpoS under Physiological Fluid Shear Conditions.
General Meeting of the American Society for Microbiology (ASM), San Francisco, CA. June 20-24, 2019

- *Selected for an oral presentation*

K. Franco, K. Crenshaw, J. Yang, J. Barrila, C. M Ott, and C.A. Nickerson.
Mechanobiology of Stationary Phase Stress Responses in *Salmonella* Typhimurium is Largely Independent of RpoS under Physiological Fluid Shear Conditions. BioSci Southwest Symposium, Arizona State University, Tempe, AZ. Nov 1, 2019

- *Selected for an oral presentation*

S. Krieger, G. Makedonas, S. Mehta, B. Rooney, M. Nelman, C. Castro, A. Colorado, C.M. Ott, J. Barrila, P. Stafford, C.A. Nickerson, C. Oubre, and B. Crucian.
Microgravity influence on bacterial pathogen virulence and immune cell function – relevance for spaceflight infectious disease risk. NASA Human Research Program Investigator's Workshop, Jan 27-30, 2020

C.M. Ott, J. Barrila, C. Oubre, S. Koroli, B. Kang, M. Laff, A. A. Colorado³, J. Yang, S. Gangaraju, P. Stafford, B. E. Crucian, and C. A. Nickerson. **Spaceflight-induced changes in microbial virulence and the impact to the host immune response.** NASA Human Research Program Investigator's Workshop, Galveston, TX, Jan 27-30, 2020

A.A. Colorado, Nickerson, C.A., C.M. Ott, **Effects of spaceflight relevant carbon dioxide levels on pathogenesis related microbial characteristics.** NASA Human Research Program Investigator's Workshop, Galveston, TX, Feb 7-10, 2022

C.M. Ott, J. Barrila, S. Koroli, A.A. Medina-Colorado³, S. Gangaraju, R. Davis, L. Banken, J. Yang, B. Kang, P. Stafford, C. Oubre, B. E. Crucian, and C. A. Nickerson. **Spaceflight-induced changes in microbial virulence and the impact to the host immune response.** NASA Human Research Program Investigator's Workshop, Galveston, TX, Feb 7-10, 2022

Yang J, Barrila J, Nauman EA, Ott CM, Nickerson CA. **Increases in physiological fluid shear enhance mechanotransductive pathogenic phenotypes and reveal molecular regulatory mechanisms in multidrug resistant *Salmonella* ST313.** American Society for Gravitational and Space Research (ASGSR) Meeting, Houston, TX, Nov 2022

Barrila J, Koroli S, Franco Meléndez KP, Yang J, Gangaraju S, Thornhill S, Almongor A, Medina-Colorado AA, Oubre C, Crucian B, Banken LL, Davis RR, Vu C, Ott CM and Nickerson CA. **Effect of spaceflight analogue culture on the growth, pathogenesis-related stress responses and infection profiles of *Salmonella* Enteritidis.** American

Cheryl A. Nickerson, Ph.D.

Society for Gravitational and Space Research (ASGSR) Meeting, Houston, TX, Nov 2022

C.M. Ott, J. Barrila, S. Koroli, A. A. Medina-Colorado, S. Gangaraju, R. Davis, L. Banken, J. Yang, B. Kang, P. Stafford, C. Oubre, B.E. Crucian, and **C.A. Nickerson**. **Spaceflight-induced changes in microbial virulence and the impact to the host immune response**. NASA Human Research Program Investigator's Workshop, Galveston, TX, Feb 7-9, 2023

J. Barrila, C.M. Ott, A.A. Medina-Colorado, S. Gangaraju, R. Davis, J. Yang, P. Stafford, and **C.A. Nickerson**. **Effects of low dose radiation and radiation countermeasures on infection by spaceflight analogue cultured *Salmonella* using 3-D biomimetic human tissue models**. NASA Human Research Program Investigator's Workshop, Galveston, TX, Feb 7-9, 2023

Yang J, Barrila J, Nauman EA, Ott CM, **Nickerson C.A**. **Increases in physiological fluid shear enhance mechanotransductive pathogenic phenotypes and reveal molecular regulatory mechanisms in multidrug resistant *Salmonella* ST313**. American Society for Microbiology (ASM) Meeting, Houston, TX, June 15-19, 2023

Barrila J, Koroli S, Franco Meléndez KP, Yang J, Gangaraju S, Thornhill S, Almongor A, Medina-Colorado AA, Oubre C, Crucian B, Banken LL, Davis RR, Vu C, Ott CM and **Nickerson CA**. **Effect of spaceflight analogue culture on the growth, pathogenesis-related stress responses and infection profiles of *Salmonella* Enteritidis**. American Society for Microbiology (ASM) Meeting, Houston, TX, June 15-19, 2023

C.M. Ott, J. Barrila, S. Koroli, A.A. Medina-Colorado, S. Gangaraju, R. Davis, L. Banken, J. Yang, B. Kang, P. Stafford, C. Oubre, B. E. Crucian, and **C. A. Nickerson**. **Spaceflight-induced changes in microbial virulence and the impact to the host immune response**. NASA Human Research Program Investigator's Workshop, Galveston, TX, Feb 13-16, 2024

J. Barrila, C.M. Ott, A.A. Medina-Colorado, S. Gangaraju, R. Davis, J. Yang, P. Stafford, and **C. A. Nickerson**. **Effects of low dose radiation and radiation countermeasures on infection by spaceflight analogue cultured *Salmonella* using 3-D biomimetic human tissue models**, NASA Human Research Program Investigator's Workshop, Galveston, TX, Feb 13-16, 2024

Ranson, T.M., S.G. Thornhill, E.G. Ortiz, J. Yang, J. Barrila, S. Gangaraju, R. Davis, **C.A. Nickerson**, A. Scouten, J. Tesic, A. McLean, C. Mark Ott, and R.J.C. McLean. **Polymicrobial biofilm formation and influence on corrosion during spaceflight**. American Society for Microbiology (ASM) Meeting, Washington, D.C., June, 2024

J. Yang, S. Gangaraju, R.R. Davis, T.M. Ranson, S. Thornhill, J.A. Barrila, A.I.L. McLean, C.M. Ott, **C.A. Nickerson**, Robert McLean. **Longitudinal Study of Silver**

Cheryl A. Nickerson, Ph.D.

Fluoride Disinfection on Mixed-Species Biofilms in Spaceflight. American Society for Gravitational and Space Research (ASGSR) Meeting, Puerto Rico, November 2024

Ranson, T.M., S.G. Thornhill, J. Yang, **C.A Nickerson**, J. Barrila, S. Gangaraju, R.R. Davis, AIL McLean, C M Ott, RJC McLean. **Spaceflight-induced changes in mixed culture biofilm structure.** American Society for Gravitational and Space Research (ASGSR) Meeting, Puerto Rico, November 2024

J. Barrila, R.J. Forsyth, R.R. Davis , J. Yang, S. Gangaraju, T.W. Virts, S. Yang, K. Buss, O. Zaborina, A. Zaborin, C. Rozalsky, J. Duncan, E. Velasco, J. Brunk, M. Parra, K. Sato, C.M. Ott, J.C. Alverdy, and **CA. Nickerson**. 2024. **Dual RNA-seq analysis and remote real-time microbial virulence monitoring of host-pathogen interactions during spaceflight.** American Society for Gravitational and Space Research (ASGSR) Meeting, Puerto Rico, November 2024

J. Barrila, C.M. Ott, A.A. Medina-Colorado, S. Gangaraju, R. Davis, J. Yang, P. Stafford, and **C. A. Nickerson**. **Effects of low dose radiation and radiation countermeasures on infection by spaceflight analogue cultured Salmonella using 3-D biomimetic human tissue models**, NASA Human Research Program Investigator's Workshop, Galveston, TX, Jan 28-31, 2025

INVITED SPEAKER PRESENTATIONS

Invited Speaker, Washington University Infectious Diseases Division, Washington University School of Medicine, St. Louis, MO, Infectious Diseases/Basic Microbiological Mechanisms Research Conference, October 10, 1996

Invited Speaker, University of Missouri, Department of Cellular and Molecular Microbiology and Immunology, University of Missouri School of Medicine and University of Missouri Cancer Research Center, Fall Seminar Series, October 2, 1997

Invited Speaker, Joint Fall Meeting, Missouri, Illinois, Kansas Microbeam Analysis Society and Central States Microscopy Society. Washington University Conference Center, St. Louis, Missouri, November 14, 1997

Invited Speaker, Department of Pathology and Laboratory Medicine Grand Rounds, Tulane University School of Medicine, March 5, 1999

Invited Speaker, Department of Pharmacology, Tulane University Medical Center, March 12, 1999

Invited Speaker, Department of Biochemistry, Tulane University Medical Center, December 6, 1999

Invited Speaker, Medicine Research Conference, Tulane University Medical Center, May 23, 2000

Cheryl A. Nickerson, Ph.D.

Invited Speaker, Louisiana Research and Technology Summit, Pennington Biomedical Research Center, Baton Rouge, LA, October 28, 2000

Invited Speaker, Recipient of the Charles C. Randall Lectureship Award for Outstanding Young Faculty Member, South Central Branch of the American Society for Microbiology (ASM), 2000

Invited Speaker, Louisiana State University, Sponsored by the Departments of Veterinarian Sciences and Life Sciences, Microbiology Seminar Series, December 2, 2000

Invited Speaker, NASA Cell Science Conference, Houston, TX, March 6-8, 2001

Invited Speaker and session co-chair, NASA Cell Science Conference, Palo Alto, CA, Feb. 26-28, 2002

Invited Speaker and session co-chair, NASA Cell Science Conference, Houston, TX, Feb. 20-23, 2003

Invited lecturer, National Youth Science Foundation, Charleston, W.V., July 2003

Invited Speaker and session co-chair, NASA Cell Science Conference, Palo Alto, CA, Feb. 26-28, 2004

Invited Speaker, Loyola University Undergraduate Seminar series, November 2002

Invited Speaker, Tulane/Xavier Women's Center Research Seminar series, April 2003

Invited Speaker, National Youth Science Camp, Charleston, W.V., July 9, 2003

Invited Speaker, Annual American Society for Microbiology (ASM) Meeting, Salt Lake City, Utah, May 19-23, 2002

Invited Speaker, Annual American Society for Microbiology (ASM) Meeting, Washington, D.C., May, 2003

Invited Speaker, Tulane Infectious Disease Seminar Series, November, 2003

Invited Speaker and Guest of Honor, St. George Observatory, Schriever, LA, August 23, 2003

Invited Speaker, Life Sciences Seminar Series, Kennedy Space Center, Cape Canaveral, FL, April, 2004

Invited Speaker and Session Co-Convener, Annual American Society for Microbiology

Cheryl A. Nickerson, Ph.D.

(ASM) Meeting, New Orleans, LA, May, 2004

Invited Speaker, Uniformed Services University of the Health Sciences. Bethesda, MD, November 8, 2004

Invited Speaker and session co-chair, NASA Cell Science Conference, Galveston, TX, Feb. 23- 25, 2005

Invited Speaker, Society for General Microbiology (SGM), Annual Meeting, Edinburgh, Scotland, April 5, 2005

Invited Speaker, 15th International Academy of Astronautics, Humans in Space Meeting, Graz, Austria, May, 2005

Invited Speaker, Women in Business/Technology; Challenges and Solutions to Achieving Success Personally and Professionally”, May 18, 2005, New Orleans, LA

Invited Speaker, Society for In Vitro Biology, Annual Meeting, Baltimore, MD, June, 2005

Invited speaker and blue-ribbon panel committee member, Entrepreneurial Paradigm for the International Space Station, June 21-22, 2005, Santa Clara, CA

Invited speaker, Tulane Medicine Research Conference, June 28, 2005

Invited Speaker, Tissue Models for Therapeutics Conference – Engineering in Vitro with Fidelity to in Vivo; Cambridge Healthtech Institute, MIT, Cambridge, Massachusetts, August 29-30, 2005

Invited Speaker, University of Missouri School of Medicine, September 22, 2005

Invited Speaker, Biodesign Institute, Arizona State University, September 28, 2005

Invited Speaker, School of Life Sciences, Arizona State University, November 29, 2005

Invited Speaker, National Institutes of Health (NIH), “HIV Preclinical-Clinical Therapeutics Research Meeting”, Bethesda, MD, May 15-16, 2006

Invited Speaker, Molecular and Cellular Biology Colloquium, Arizona State University, October 30, 2006

Invited Speaker, Department of Bioengineering, Arizona State University, November 17, 2006

Invited Speaker, Department of Surgery, University of Chicago, November 21, 2006, Chicago, IL

Cheryl A. Nickerson, Ph.D.

Invited Speaker, NASA Human Research Program Investigators' Workshop. Feb 14-16, 2007, South Shore Harbour Resort, Texas

Invited Speaker, American Society for Microbiology (ASM) Meeting, Toronto, Canada, May 20-24, 2007

Invited speaker, International Conference on Molluscan Shellfish Safety, New Zealand, March 18-23, 2007

Invited Speaker, NASA International Space Development Conference, May 25-28, 2007, Dallas, Texas

Invited Speaker, International Workshop on Space Microbiology, September 19-21, 2007, Tokyo, Japan

Invited Speaker, International Space Station National Laboratory Workshop: Developing the First National Laboratory beyond Earth, Oct 2-4, 2007, NASA Ames Research Center, Moffett Field, CA

Invited Speaker, Departments of Pathobiological Sciences and Comparative Biomedical Sciences, Louisiana State University, November 29, 2007, Baton Rouge, LA

Invited Speaker, Center for Biological Physics, Arizona State University, December 11, 2007

Invited Speaker and panel participant, Biotechnology Space Research Alliance, University of California San Diego, San Diego CA, June 17-18, 2008

Invited Speaker, University of Texas Medical Branch at Galveston/NASA JSC Aerospace Medicine Program Grand Rounds, Houston, TX, July 22, 2008

Invited Speaker, Cell Biology Seminar Series, TGen, Phoenix, AZ, September 24, 2008

Invited Speaker, Department of Molecular, Cellular and Developmental Biology, University of Colorado Microbiology Symposium, Boulder, CO, October 22, 2008

Invited Speaker and Panel Member, Howard Hughes Medical Institute (HHMI) Interfaces Scholars Career Panel, Chevy Chase, MD, September 15-18, 2008

Invited Speaker, Biotechnology Utilization Planning for the International Space Station National Laboratory, Kennedy Space Center, November 13-15, 2008

Invited Speaker, Department of Microbiology and Immunology, University of Michigan Microbiology Symposium, Ann Arbor, MI, March 11-12, 2009

Cheryl A. Nickerson, Ph.D.

Invited member, *Expert Group for Development of Strategic Research Enabling European Human Space Exploration*, European Science Foundation, Cedex, France, Spring, 2009

Invited Speaker, International Space Station Research Results and Applications to Medical Operations, Aerospace Medical Association Meeting, Los Angeles, CA, May 3-7, 2009

Invited Speaker and Panel Member, The International Space Station as a National Laboratory – Utilizing the ISS to its Full Potential for Life Sciences Research. BIO2009, Atlanta, GA, May 2009

Invited Speaker, Sixth International Space Life Sciences Working Group (ISLSWG) Workshop on Space Microbiology, Sonoma, CA. August, 24-26 2009

Invited Speaker, The International Space Station as a National Lab, American Society for Gravitational and Space Biology, Raleigh, N.C., November 2009

Invited Speaker, Department of Medicinal Chemistry, University of Utah, Salt Lake City, UT, December 3, 2009

Invited Speaker, Department of Bioengineering, University of Utah, Salt Lake City, UT, December 4, 2009

Invited Speaker, The Beyond Center for Fundamental Concepts in Science – Physical Sciences in Oncology Cancer Forum Workshop. Arizona State University, Tempe, AZ, February 10-12, 2010

Invited Keynote Speaker, 12th Annual Gut Day Symposium, Gent, Belgium, September 23, 2010

Invited Speaker, International Symposium for Personal and Commercial Spaceflight (ISPCS), October 20-21, 2010, Las Cruces, NM

Invited Speaker, University of Pittsburgh Molecular Virology and Microbiology Graduate Program Symposium, April 29, 2011

Invited Speaker, Department of Molecular Microbiology and Immunology and Department of Biochemistry, University of Missouri, October 18, 2011

Invited Speaker and Panel Member, NASA Shuttle Mission STS-135 and International Space Station Research and Technology Briefing, Pre-flight Press Conference, Kennedy Space Center, Cape Canaveral, FL, July, 2011

Invited Speaker, American Society for Gravitational and Space Biology, “Tissue Engineering in Simulated and Actual Microgravity”, San Jose, CA, November 5, 2011

Cheryl A. Nickerson, Ph.D.

Invited Speaker, 9th International Conference and Workshop on Biological Barriers - in vitro and in silico Tools for Drug Delivery and Nanosafety Research, Saarland University, Germany, February 29 - March 9, 2012

Invited Speaker, First Annual International Space Station Research and Development Conference, Denver, CO, June 26-28, 2012

Invited Speaker, *Microgravity: A Novel Tool for Advances in Biomedical Research*, presented in session “Science from the International Space Station”, American Association for the Advancement of Science (AAAS) Annual Meeting, Boston, Mass, Feb 14-18, 2013

Invited Speaker and Session Chair, Phoenix-NASA International Space Station Science Symposium, ASU Sky Song, Phoenix, AZ, Feb 24, 2013

Invited Speaker, Physical Sciences of Cancer, the Beyond Center, ASU, March 21, 2013

Invited Speaker, NIH Enteric Research Investigational Network (ERIN) Workshop: Systems Approach to Studying the Functions of Microbial Communities. Traverse City, MI, June 3-4, 2013

Invited Speaker, American Institute of Aeronautics and Astronautics, session *Innovation: Societal Imperatives and Commercial Opportunities – Value of the Microgravity Research Platform*. San Diego, CA, Sept 11, 2013

Invited Speaker – Arizona State University (ASU)-Dublin City University (DCU) Collaborative Workshop, January 13, 2014, the Biodesign Institute, ASU, Tempe, AZ

Invited participant - *Spark 101* video production for high school students based on my lab’s spaceflight biomedical research. *Spark 101* is “a new teaching resource designed to bridge the gap between classroom learning and real-world applications. Its mission is to engage students, educators, and organizations. To connect everyday problems faced by industry to classrooms, and to inspire students to pursue STEM-related college majors and careers”. <http://www.spark101.org/video/researching-bacterias-virulence-in-space/> Jan 2014

Invited Speaker – Spirit of the Senses, ASU Biodesign Institute, March 20, 2014

Keynote Speaker, Leading Through Collaboration, International Society for Medical Publication Professionals (ISMPP), Arlington, VA April 7-9, 2014

Invited speaker, Phoenix Rotary Club, Phoenix Country Club, Phoenix, AZ, Oct 3, 2014

Invited keynote speaker, President’s Symposium, American Society for Space and Gravitational Research, Pasadena, CA, Oct 22, 2014

Cheryl A. Nickerson, Ph.D.

Invited panel participant, Arizona Strategic Futures Initiative event, ASU Fulton Center, Tempe, AZ, Nov 3, 2014

Invited Speaker and Panel Member, SpaceX CRS-5 and International Space Station Research and Technology Briefing, Pre-flight Press Conference, Kennedy Space Center, Cape Canaveral, FL, Jan 5, 2014

Invited Speaker, The International Space Station: A Built Environment for Microbial Research, American Society for Microbiology (ASM) Meeting, New Orleans, LA, May 30-June 2, 2015

Invited Speaker and Panel Member, *Meet the Scientist Workshop Session*, American Society for Space and Gravitational Research, Arlington, VA, Nov, 2015

Invited Speaker and Panel Member, *Jumpstarting STEM Careers Conference*, Association for Women in Science, Arizona Chapter, Jan 15, 2016

Invited Speaker, *Higher Orbits—Go for Launch!* Space-inspired mission discovery STEM event for students grades 8-12. Mesquite High School, Gilbert, AZ, Feb 18-20, 2017

Invited Speaker, *3-D Mucosal Immune System Models for Health and Disease*, presented at the “DECISIVE” New Projects in Synthetic Biology and Organism Engineering, Arizona State University, Feb 21, 2017

Invited Speaker, Outpacing Infectious Disease: Mimicking the host-pathogen microenvironment *in vitro* for studying mucosal infections, Center for Immunotherapy, Vaccines and Virotherapy. Arizona State University, Tempe, AZ, March 15, 2017

Invited Speaker, Regenerative Medicine/Tissue Engineering session for the 2nd Annual *Molecular, Cellular, and Tissue Bioengineering Symposium*, Arizona State University, April 1, 2017.

Invited Speaker, National Academies of Sciences, Engineering and Medicine’s Committee on a Midterm Assessment of Implementation of the Decadal Survey on Life and Physical Sciences Research at NASA. *Spaceflight Microbial Research and Infectious Disease Risk: Impact on Astronaut Health and Exploration Missions*. National Academies of Sciences, Washington, D.C., April 19, 2017

Invited Speaker, *American Society for Virology/American Society for Microbiology, Conference on Interplay of Viral and Bacterial Pathogens*, May, 2017. *Jiseon Yang, postdoctoral fellow in my lab, presented this invited lecture

Invited Speaker, *GeneLab for High School Students, Data Mining for the Next Generation*, STEM event for high school students, NASA Ames Research Center, Moffett Field, California, June 20, 2017

Cheryl A. Nickerson, Ph.D.

Invited Speaker, WiseGuise, Phoenix, AZ, Dec 1, 2017

Invited speaker, TEDxASU: *Boundless*, March 31, 2018, Tempe Center for the Arts, Tempe, AZ

Invited speaker, *Synthetic Biology, Engineering, Evolution, and Design (SEED)* 2018 meeting Scottsdale, AZ, June 3-7, 2018

Invited speaker, “*Microgravity: A Novel Research Platform to Advance Human Health*”, Biodesign VIP Summer Salon, Flagstaff, AZ, July 18, 2018

- The goal of Biodesign Institute (BDI) Salons is to expose BDI researchers to broader communities of interest in an effort to highlight our work, seek funding and expand our base of philanthropic donors.

Invited speaker and panelist, “Responsibilities of Authorship”, School of Life Sciences Undergraduate Research (SOLUR), Arizona State University, Sept 7, 2018

Invited speaker, ASM Distinguished Lecturer, Eastern Pennsylvania Branch ASM, Philadelphia, PA, September 24, 2018

Invited panelist and speaker, *Leading Women: Biotech and Beyond*, AZ BIO, Phoenix Convention Center, Phoenix, AZ, October 1, 2018

Invited speaker, University of Louisville, Department of Microbiology and Immunology, Louisville, KY, Oct 4, 2018

Invited speaker, ASM Distinguished Lecturer, Eastern New York Branch ASM, Albany, NY, October 16, 2018

Invited speaker, ASM Distinguished Lecturer, Texas Branch ASM, Corpus Christi, TX, November 8-10, 2018

Invited Speaker, Gastronomists, Duke University, Durham, NC, Feb 5, 2019

Invited speaker, ASM Distinguished Lecturer, Missouri Valley Branch ASM, Omaha, NB, March 15-16, 2019

Invited speaker, GRK 2157 “*3D Tissue Models for studying Microbial interactions by Human Pathogens*”, 3D Tissue Infection Symposium, Wuerzburg, Germany, April 5-7, 2019

Invited speaker, Nature-NASA Conference on “*The Microbiology of Human Spaceflight*”, Johnson Space Center, Houston, TX June 24-27, 2019

Cheryl A. Nickerson, Ph.D.

Invited speaker, NIH-NASA Summer 2019 Seminar Series, “*Microbial pathogen responses to biomechanical forces in infected hosts and microgravity environments*”, webinar, July 11, 2019

Invited Keynote Speaker, Commercial Spaceflight Federation annual meeting, Arizona State University, Tempe, AZ, Sept 16, 2019

Invited speaker, ASM Distinguished Lecturer, North Carolina Branch ASM, Greensboro, NC, October 19, 2019

Invited speaker, “*3D Tissues and Microphysiological Systems*”, NIH/NCATS pre-workshop, American Society for Gravitational and Space Research Annual Meeting, Denver, CO, Nov 19, 2019

Invited speaker, Biomedical Advanced Research and Development Authority (BARDA), March 16, 2020.

Invited speaker, ASM Distinguished Lecturer, Indiana Branch ASM, Indianapolis, Indiana, April 3-4, 2020

Invited speaker, Gastronomists Global Symposium, “Where the Gut Meets the Brain”, Nantes, France, May 19-22, 2020

Invited speaker, 21st Century Research – Moving Beyond Animals in the Neurosciences and Infectious Disease Research, Arizona State University, Tempe, AZ, April 24, 2020

Invited speaker, American Society for Space and Gravitational Research (ASGSR) Decadal Workshop: Space Microbiology Town Hall. October 14, 2020

Invited speaker, Space Biomanufacturing Thought Leadership Symposium, the Kennedy Space Center, Cape Canaveral, FL, Nov 18-19, 2020

Invited speaker, Infectious Diseases and Global Health Training Program, University of Manitoba, Nov 26, 2020

Invited speaker, Johns Hopkins University Bioastronautics Initiative, Virtual Symposium on Human Spaceflight, Feb 24, 2021

Invited speaker and panelist, New York Health Forum “*Investing in Space – Next Frontier of Healthcare*”, March 16, 2021

Invited speaker, Gastronomists Global Symposium, “Where the Gut Meets the Brain”, Virtual Meeting, May 19-22, 2021

Invited speaker, Department of Biomedical Engineering, “*Mechanobiology of Infectious Disease*”, University of Iowa, November 30, 2021.

Cheryl A. Nickerson, Ph.D.

J. Barrila, S. Gangaraju, H.A. Lorenzi, H. Bean, C.M. Ott, C.A. Nickerson. *Contributions of the microbiome in astronaut health: a new dimension in modeling crew infectious disease risks*. 44th Committee on Space Research (COSPAR) Scientific Assembly, Athens, Greece, July 16-24, 2022. *(Note: Jennifer Barrila was the invited speaker for this seminar to present our team's research).

Invited Keynote Speaker, American Society for Microbiology (ASM) South Central Branch Meeting, Shreveport, Louisiana, October 27-29, 2022

Invited Speaker, Uniformed Services University of the Health Sciences. Bethesda, MD, November 7, 2022

Invited Speaker, *Role of RpoS in regulating stationary phase Salmonella Typhimurium pathogenesis-related stress responses under spaceflight analogue low fluid shear force conditions*. American Society for Space and Gravitational Research (ASGSR) Meeting, Houston, TX, Nov 2022

Invited speaker and panelist, Space Science session, Arizona Space Summit, ASU, Tempe, AZ, April 6, 2023

Invited Speaker, Microbiology and Immunology Departmental Seminar Series, Department of Microbiology and Immunology, Tulane University School of Medicine, New Orleans, LA, May 3, 2023

Invited speaker and participant, Host-Microbe Biology retreat for the American Society for Microbiology (ASM) Council on Microbial Sciences, May 30 – June 1, 2023. Presentation title: *Mechanobiology and Phenotypic Plasticity in Modeling Host-Microbe Biology: From Human and Animal Health to Habitat Sustainability*. The goal of this meeting is to provide ASM with a vision of the future of host-microbe interaction research in the next 20 years, and the opportunities and resources needed to address these challenges. May 30 – June 1, 2023

Invited Speaker and Co-Developer, ASM Mini-Conference Session, *The Microbiology of Human Spaceflight: Astronaut Health and Habitat Sustainability*, American Society for Microbiology (ASM) Microbe Meeting, Houston, TX, June 15-19, 2023

Invited Speaker, *Meet the Expert*, American Society for Microbiology (ASM) Microbe Meeting, Houston, TX, June 15-19, 2023

Invited Speaker, Department of Immunobiology, College of Medicine, University of Arizona, Tucson, AZ, September 22, 2023

Invited Speaker, External Seminar Series, GlaxoSmithKline, Rockville, MD, October 9, 2023

Cheryl A. Nickerson, Ph.D.

Invited Keynote Speaker, University of Colorado Anschutz Medical Campus Colorado, Annual Molecular Biology Program Retreat, Denver, CO, October 26-28, 2023

Invited Speaker, Arizona State University, Bioethics Breakfast Club, “*Life in Space*”, Jan 17, 2024

Invited Speaker, Introduction to Human Space Exploration and Medicine, Baylor College of Medicine, January 24, 2024

Invited Speaker and Panelist, Commercial Low Earth Orbit (LEO) Research and Development session, Arizona Space Summit, ASU, Tempe, AZ, March 28, 2024

Invited Participant, *Aliens Among Us: How can Microbes and Space Exploration Co-Exist?*”, ASU BioBanter, Arizona State University, September 9, 2024

Invited Speaker, Lifelong Learning Signature Lecture, Mirabella at ASU, Tempe, AZ, Sept 12, 2024

Invited Speaker, Foundations in Microbiology (MIC 50), ASU, Tempe, AZ, November 12 & 14, 2024

Invited Speaker, Department of Basic Medical Sciences, University of Arizona College of Medicine, Phoenix, AZ, Jan 23, 2025

Invited Speaker, Digestive Diseases Week, Annual Conference, San Diego, CA, May 3-6, 2025

Invited Keynote Speaker, “*Scales Shaping Microbial Community Interactions and Activity*”, Applied and Environmental Microbiology, Gordon Research Conference, July 13-18, 2025.

PUBLICATIONS

1. **Nickerson, C.A.** and E.C. Achberger. 1995. **Role of Curved DNA in Binding of *Escherichia coli* RNA Polymerase to Promoters.** *J. Bacteriol.* **177**: 5756-5761.
2. **Nickerson, C.A.** and R. Curtiss III. 1997. **Role of Sigma Factor RpoS in Initial Stages of *Salmonella typhimurium* Infection.** *Infect. Immun.* **65**:1814-1823.
3. R. Curtiss III, L. Burns-Keliher, B.J. Morrow, **C.A. Nickerson**, and M.R. Wilmes-Riesenberg. 1997. **Toward an understanding of *Salmonella* pathogenicity.** *Bulletin of the Polish Academy of Sciences, Biological Sciences.* Vol.44. No. 3-4.
4. Burns-Keliher, L., **Nickerson, C.A.**, Morrow, B.J., and R. Curtiss III. 1998. **Cell Specific Proteins Synthesized by *Salmonella typhimurium*.** *Infect. Immun.* **66**:856-

861.

5. **Nickerson, C.A. Understanding microbial pathogenesis.** 1999. *Trends Microbiol.* **7**:480.
6. **Nickerson, C. A., Ott, M., Mister, S.J., Morrow, B.J., Burns-Keliher, L., and Pierson, D.L.** 2000. **Microgravity as a novel environmental signal affecting *Salmonella enterica* serovar Typhimurium virulence.** *Infect. Immun.* **68**:3147-3152.
7. **Nickerson, C.A. Stomach Islands.** 2000. *Trends Microbiol.* **8**:59.
8. **Nickerson, C.A. Macrophage-specific fimbriae.** 2000. *Trends Microbiol.* **8**:211.
9. **Nickerson, C.A. Understanding TB persistence.** 2000. *Trends Microbiol.* **8**:352-353.
10. **Nickerson, C.A. Altered gene expression in response to *Bordetella pertussis* infection.** 2001. *Trends Microbiol.* **9**:57-58.
11. **Nickerson, C.A. Putting *C. elegans* to Gram positive use.** 2001. *Trends Microbiol.* **9**:581.
12. Brown, P.K., Dozios, C., **Nickerson, C.A.,** Terlonge, J., Zuppardo, A., and R. Curtiss III. 2001. **A novel positive regulator of curli synthesis in an avian pathogenic *Escherichia coli* strain.** *Mol. Microbiol.* **41**:349-364.
13. **Nickerson, C.A.,** Goodwin, T.J., Terlonge, J., Ott, C.M., Buchanan, K.L., Uicker, W.B., Emami, K., Cedor, C.L., Ramamurthy, R., Hammond, T., and D L. Pierson. 2001. **Three-Dimensional Tissue Assemblies: Novel Models for the Study of *Salmonella enterica* Serovar Typhimurium Pathogenesis.** *Infect. Immun.* **69**:7106-7120.
 - Selected for cover feature and highlight in American Society for Microbiology/ASM News magazine – now called Microbe).
14. Wilson, J., Schurr, M., LeBlanc, C., Ramamurthy, R., Buchanan, K., and **C.A. Nickerson.** 2002. **Mechanisms of Bacterial Pathogenicity. (Invited Review).** *British Medical Journal Publishing Group - Postgraduate Medical Journal.* **78**:216-224.
15. Wilson, J., Ramamurthy, R., Porwollik, S., McClelland, M., Hammond, T., Allen, P., Ott, C.M., Pierson, D.L., and **C.A. Nickerson.** 2002. **Microarray analysis identifies *Salmonella* genes belonging to the low-shear modeled microgravity regulon.** *Proc. Natl. Acad. Sci. USA.* **99**:13807-13812.
16. Wilson, J., Ramamurthy, R., Ott, C.M., Porwollik, S., McClelland, M., Pierson, D., and **Nickerson, C.A.** 2002. **Low shear modeled microgravity alters the *Salmonella typhimurium* response in an RpoS-independent manner.** *Appl.*

Environ. Microbiol. **68**:5408-5416.

17. **Nickerson, C.A., C. M. Ott, J.W. Wilson, J., R. Ramamurthy, C. L. LeBlanc, K. Höner zu Bentrup, T. Hammond, and D. L. Pierson.** 2003. **Low Shear Modeled Microgravity: A Global Environmental Regulatory Signal Affecting Bacterial Gene Expression, Physiology, and Pathogenesis.** (*Invited Review*) *J. Microbiol. Methods.* **54**:1-11.
18. Wilson, J., Figurski, D, and **Nickerson, C.A.** 2004. **VEX-capture: A new technique that allows in-vivo excision, cloning, and broad-host-range transfer of large bacterial genomic DNA segments.** *J. Microbiol. Methods.* **57**(3):297-308.
19. **Nickerson, C.A., C. M. Ott, J.W. Wilson, and D. L. Pierson.** 2004. **Microbial responses to microgravity and other low shear environments.** (*Invited Review*) *Microbiology and Molecular Biology Reviews.* **68**:345-361.
20. **Nickerson, C.A., and C.M. Ott.** 2004. **A New Dimension in Modeling Infectious Disease** (*Invited Review*). *ASM News.* **70**(4):169-175.
 - *This publication received the cover art illustration for ASM News.*
21. Carterson, A.J., Höner zu Bentrup, K., Ott, C.M., Clarke, M.S., Vanderburg, C.R., Buchanan, K.L., Pierson, D., **Nickerson, C.A.,** and M. J. Schurr. 2005. **A549 lung epithelial cells grown as 3-D aggregates: Alternative tissue culture model for *P. aeruginosa* pathogenesis.** *Infect Immun.* **73**:1129-1140.
22. D'Elia, R., Allen, P.A., Johanson, K., **Nickerson, C.A.,** and T.G. Hammond. 2005. **Homozygous diploid deletion strains of *Saccharomyces cerevisiae* that determine lag phase and dehydration survival.** *Applied Microbiology and Biotechnology.* Jun;67(6):816-26.
23. LaMarca, H.L., C. M. Ott, K. Höner zu Bentrup, C. L. LeBlanc, D.L. Pierson, **C. A. Nickerson,** A. B. Nelson, and C. A. Morris. 2005. **Three-dimensional growth of extravillous cytotrophoblasts promotes differentiation and invasion.** *Placenta.* 10:709-720.
24. **Nickerson, C.A., Höner zu Bentrup, K., and C.M. Ott.** 2005. **Three-dimensional cell culture models for drug discovery and infectious disease.** (*Invited Review*). *Bioforum Europe.* 6:34-36.
25. Wilson, J.W., and **C. A. Nickerson.** 2006. **Cloning of a functional *Salmonella* SPI-I type III secretion system and development of a method to create mutations and epitope fusions in the cloned genes.** *Journal of Biotechnology.* Mar 23;122(2):147-60.

26. Wilson, J.W., and C. A. Nickerson. 2006. **A new experimental approach for studying bacterial genomic island evolution identifies island genes with bacterial host-specific expression patterns.** *BMC Evol Biol.* 2006 Jan 5;6(1):2.
27. Höner zu Bentrup, K., Ramamurthy, R., Ott, M., Emami, K., Nelman-Gonzalez M., Wilson, J.W., Richter, E.G., Goodwin, T., Pierson, D., Alexander, S., Pellis, N., Buchanan, K., and C.A. Nickerson. 2006. **3-D organotypic models of human colonic epithelium to study the early stages of enteric salmonellosis.** *Microbes and Infection.* 2006 Jun;8(7):1813-1825.
28. Johanson, K, Allen, P., Gonzalez-Villalobos, A., Nesbitt, J., Nickerson, C.A., Höner zu Bentrup, K., Wilson, J.W., Ramamurthy, R., D'Elia, R., Muse, K.E., Freeman, J., Stodieck, L.S., and T.G. Hammond. 2006. **Haploid deletion strains of *Saccharomyces cerevisiae* that determine survival during spaceflight.** *Acta Astronautica.* 60(4-7):460-471.
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32. Santander, J.M, Wanda, S.Y., Nickerson, C.A., and R. Curtiss III. 2007. **Role of RpoS in fine-tuning the synthesis of Vi capsular polysaccharide in *Salmonella enterica* serotype Typhi.** *Infect Immun.* 75:1382-92.
33. Wilson, J.W., Coleman, C., and Nickerson, C.A. 2007. **Cloning and transfer of the *Salmonella* SPI-2 type III secretion system for studies in a range of Gram negative genera.** *Appl. Environ. Microbiol.* 2007 Sep;73(18):5911-8.
34. J.W. Wilson, C.M. Ott, K. Höner zu Bentrup, R. Ramamurthy, L. Quick, S. Porwollik, P. Cheng, M. McClelland, G. Tsaprailis, T. Radabaugh, A. Hunt, D. Fernandez, E. Richter, M. Shah, M. Kilcoyne, L. Joshi, M. Nelman-Gonzalez, S. Hing, M. Parra, P. Dumars, K. Norwood, R. Bober, J. Devich, A. Ruggles, C. Goulart, M. Rupert, L. Stodieck, P. Stafford, L. Catella, M.J. Schurr, K. Buchanan, L. Morici, J. McCracken, P. Allen, C. Baker-Coleman, T. Hammond, J. Vogel, R. Nelson, D.L. Pierson, H.M. Stefanyshyn-Piper, and C.A. Nickerson. 2007.

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- *This publication was covered in over 600 national and international media outlets, including press releases, television, radio, newspaper, and scientific journal reviews. It remains one of the most highly covered publications from the Biodesign Institute at ASU.*
35. Cody, W. Wilson, J.W., Hendrixson, D.R., McIver, K.S., Hagmann, K.E., Ott, C.M., **Nickerson, C.A.**, and M. Schurr. 2008. **Skim milk enhances the viability of frozen bacterial stocks.** *J Microbiol Methods.* 2008 Sep;75(1):135-8.
36. T.A. Myers, **C.A. Nickerson**, D. Kaushal, C.M. Ott, K. Höner zu Bentrup, R. Ramamurthy, M. Nelman-Gonzales, D.L. Pierson, M.T. Philipp. 2008. **Closing the Phenotypic Gap between Transformed Neuronal Cell Lines in Culture and Untransformed Neurons.** 2008 Sep 15;174(1):31-41. *Journal of Neuroscience Methods.*
37. J.W. Wilson, C.M. Ott, L. Quick, R. Davis, E. Richter, S. Sarker, A. Crabbe, M. Porter, K. Höner zu Bentrup, R. Ramamurthy, G. Tsaprailis, M. Shah, M. Nelman-Gonzalez, R. Bober, J. Devich, A. Ruggles, J. Barrila, Benjamin, J., C. Goulart, M. Rupert, L. Stodieck, P. Stafford, L. Catella, M.J. Schurr, K. Buchanan, D.L. Pierson, Gorie, D., and **C.A. Nickerson**. 2008. **Media ion composition controls regulatory and virulence response of *Salmonella* in spaceflight.** *PLoS ONE.* 3(12): e3923.
38. La Belle, J.T., Shah, M., Reed, J., Nandakumar, V., Alford, T.L., Wilson, J.W., **Nickerson, C.A.**, and Joshi, L. 2009. **Label-Free and Ultra-Low Level Detection of *Salmonella enterica* serovar Typhimurium Using Electrochemical Impedance Spectroscopy.** *Electroanalysis.* 21:20, 2267-71.
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41. L.E. O'Sullivan, **C.A. Nickerson**, and J.W. Wilson. 2010. **A series of IncQ-based reporter plasmids for use in a range of Gram negative genera.** *Journal of Microbiology and Biotechnology.* May;20(5):871-4.
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 - This publication received the cover art illustration for *Nature Reviews Microbiology*.
45. Radtke, A., Wilson, J.W., Sarker, S., and C.A. Nickerson. 2010. **Analysis of interactions of *Salmonella* type three secretion mutants with 3-D intestinal epithelial cells.** *PLoS ONE*, 2010 Dec 29;5(12):e15750.
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