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Research virology
Antonio E. Garmendia
Pathobiology & Veterinary Science, CANR

Molecular Diagnostic & Vaccine Research
Mazhar I. Khan
Department of Pathobiology & Veterinary Science, CANR

Microbial Community Ecology of Host-Microbe Symbioses
Jonathan Klassen
Department of Molecular and Cell Biology, CLAS

Virus Determinants of Virulence
Guillermo Risatti
Department of Pathobiology and Veterinary Science, CANR

Vaccine Design & Development
Paulo H. Verardi
Department of Pathobiology and Veterinary Science, CANR

Structure-based Design of Novel Antibiotics
Amy C. Anderson
Dept. of Pharmaceutical Sciences

Laboratory of Oral Microbial Ecology
Patricia Diaz
Division of Periodontology School of Dental Medicine

Molecular Microbiology/Vaccinology
Steven J. Geary
Department of Pathobiology & Veterinary Science

BioMass Laboratories
Richard S. Parnas
Dept. of Chemical & Biomolecular Engineering Polymer Program, Institute of Materials Science

Resistance, Killing and Germination of Spores of Bacillus Species
Peter Setlow
UCONN Health Center

Developing third generation Live-Attenuated Vaccines for Mycoplasma gallisepticum
L.K. Silbart
Department of Allied Health Sciences

Systems Biology & Metabolic Engineering
Ranjan Srivastava
Department of Chemical & Biomolecular Engineering

Protein Assembly Lab
Carolyn Teschke
Dept. of Molecular & Cell Biology

Bacterial Pathogenesis Laboratory
Xiaohui Zhou
Department of Pathobiology and Veterinary Science

Burns-lab
Department of Pathobiology & Veterinary Science

Benson Lab
Department of Molecular and Cell Biology, CLAS
Cytoskeletal control of membrane remodeling in genetic and infectious diseases

The actin and microtubule cytoskeletons are crucial for normal and pathogenic processes.

Enterohemorrhagic *E. coli* (EHEC) is the leading cause of bloody diarrhea and acute kidney failure in children in the U.S.

How do actin nucleation factors drive membrane remodeling and transport during neurodevelopment?

We use fluorescence microscopy, live cell imaging, genetic recombineering, and biochemical assays of protein-protein interactions to answer these questions.

**Basic Cell Biology**


**Host-Pathogen Interactions**


My lab works on:

- Bacteria/host signaling during symbiosis in plants and termites
- *in vitro* culture of termite gut communities
- Bacteria / predator signaling & interactions
- Developing new techniques for monitoring bacterial behavior, in real time, in complex environments

Currently funded by:

- USDA, DOE, NSF & Gates Foundation

Techniques Used:

- Molecular biology/genetics, synthetic biology, transcriptomics, fluorescence microscopy, image analysis

Future interests:

- Tests of predator-mediated bacterial transport in field trials
- Imaging of all sorts

Representative manuscripts (not all recent!):

- Better to light a candle than curse the darkness: illuminating spatial localization and temporal dynamics of rapid microbial growth in the rhizosphere. Frontiers in Plant Sciences (2013)
- Nuclear magnetic resonance structure and dynamics of the response regulator Sma0114 from Sinorhizobium meliloti. Biochemistry (2012)

Daniel Gage
http://web.uconn.edu/gage
daniel.gage@uconn.edu
91 N. Eagleville Rd. Storrs, CT, 06269
860-486-3092
Gene and genome evolution in microorganisms

- Impact of horizontal gene transfer on microbial genomes, taxonomy, physiology.
- Patterns of gene transfer may allow to place and characterize extinct groups of microorganisms in the tree/net of life.
- Inteins are self-splicing parasitic genetic elements that often use a homing endonuclease domain to invade their target gene. These parasites provide a measure for gene transfer within and between populations.
- Implementation of computational approaches to detect transferred genes, to study selection acting on genes, and to reconstruct ancestral gene sequences.


J. Peter Gogarten has expertise in comparative genomics, molecular evolution, and phylogenetic approaches. His current work is funded through the NSF Assembling the Tree of Life and the NASA Exobiology Programs.

Contact Us: J. Peter Gogarten * gogarten@uconn.edu * http://gogarten.ucon.edu * 860 486 4061* BP 404 *
Natural, environmentally-friendly approaches for improving food safety

- Reducing antibiotic resistance and virulence in foodborne pathogens using natural, plant-derived molecules.
- Reducing pathogen colonization in food animals using plant-derived antimicrobials.
- Investigating host-pathogen interactions.
- Research revealed the potential use of plant molecules for inhibiting bacterial quorum sensing, biofilm production, and reducing virulence and antibiotic resistance in pathogens.
- Funding from USDA-NIFA, American Meat Institute Foundation, National Cattlemen’s Beef Association, and industry.
- Techniques employed include cell culture and molecular tools, including microarrays, next-gen sequencing, quantitative RT-PCR, flow cytometry, and proteomics.
- Ongoing and future research on investigating the role of gut microbiome in mitigating pathogens in food animals.

Dr. Venkitanarayanan’s research program on food safety has been supported by several competitive federal grants. He has published over 75 peer-reviewed journal manuscripts, 10 book chapters and characterized five new bacterial genes. He currently mentors eleven graduate students, and one postdoctoral scientist in his laboratory.

kumar.venkitanarayanan@uconn.edu
Phone: 860-486-0947
Our objectives are to reveal the impacts of horizontal gene transfer on thermophiles and to explore their potential for biofuel generation

Questions we address include:

- How do the functions of horizontally acquired genes change as a consequence of their evolutionary history?
- What is the role of the loose outer cell envelope of thermophiles in gene exchange?
- Can *Thermus* serve as a platform for biofuel generation from biomass?

Future interests and collaborations:

- We have begun to use proteomic analyses of cell envelopes and will explore its use further.
- Metabolomic analysis of cells with genetically modified pathways is of interest.

Kenneth Noll has expertise in microbial physiology, especially of extremely thermophilic bacteria and archaea and strict anaerobes. His studies are based on the evolutionary progression of physiological processes and cell structure.

Contact: Kenneth Noll  kenneth.noll@uconn.edu  
(860) 486-4688
Goal of our research: To understand the complex processes of prokaryotic evolution by experimentation with halophilic archaea in the environment, and the laboratory.

- Questions we address:
  - How does speciation occur?
  - How does gene exchange occur?
  - How did polyploidy evolve?
- Major Findings:
  - Halophilic archaea are highly “sexual”, within and between species
  - DNA’s other “function” is an intracellular and extracellular nutrient storage polymer
- Methodology:
  - We combine field studies, molecular laboratory experimentation and phylogeny
- Recent Publications:

The Hypersaline Environment

Sea salt evaporation ponds. The red color is carotenoids produced archaea living in saturated (35% NaCl) brine.

Evolution of Sex?

Model for gene exchange via cell fusion in halophilic archaea

Funding sources

Contact: email, thane@uconn.edu; website, http://www.papkelab.uconn.edu/index.html, phone number, 860-486-7963
Drs. Radolf, Salazar, and Caimano collectively have published approximately 200 peer-reviewed papers and have approximately 1.5$ M in NIH funding per year (continuously funded since 1989).

**Mission:** To study the molecular pathogenesis and immunobiology of syphilis and Lyme disease, two major global threats to public health

- We use state of the art structural, genetic, immunological, transcriptional, and imaging methodologies to study Lyme disease and syphilis in ticks, animal models, and humans. We have pioneered many technical and conceptual innovations in our field.
- Our syphilis translational work has global outreach (based in Cali, Colombia).

**Email:** JRadolf @up.uchc.edu
**Phone:** (860) 679-8480
We study host/microbe interactions in a model organism, the Hawaiian bobtail squid

- Specific Interests: host innate immune system interactions with symbiotic and non-symbiotic bacteria; symbiont inhibition of biofilms in host eggs
- Can study both a single symbiont and bacterial consortium in the same host
- Funding: National Science Foundation and UCONN Research Foundation
- Methods and Techniques: proteomics, transcriptomics, genomics, confocal microscopy, fluorescent in-situ hybridization, live imaging
- Future interests: Quantitative proteomics, natural products identification and purification, genome analyses

Spencer V. Nyholm, Ph.D. has extensive experience studying host/microbe interactions and has used a number of invertebrate models in his research. He has made significant contributions to understanding the mechanisms by which specificity is ensured during initiation and maintenance of the association between the Hawaiian bobtail squid Euprymna scolopes and the bacterium Vibrio fischeri.

Contact: spencer.nyholm@uconn.edu
860-4864-4886 http://nyholmlab.uconn.edu
91 N. Eagleville Rd., Storrs CT 06269
My laboratory investigates how the microbiome affects the well-being of animals.

- We study microbe-microbe and microbe-host interactions of digestive-tract microbiomes using a combination next-generation sequencing, metabolomics, genetic approaches and microscopy.
- We also research the evolution of host-specificity using comparative genomics and different virulence models.
- We investigate the microbiomes of animal models with simple or complex communities (medicinal leeches and termites) and humans (premature infants).
- We use next-generation sequencing to characterizing microbiomes, metagenomes and transcriptomes as well as genomes.

About the PI
Dr. Graf received his Ph.D. from U.S.C, was the recipient of an NSF Career award and is currently funded by the NIH, NSF and ARC.

Contact: Joerg.Graf@uconn.edu
P:860-486-9284
http://web.uconn.edu/mcbstaff/graf/Graf.html
Natural approaches to promote food safety and gut health

**Food safety**
- Use of probiotics and antimicrobial peptides in food safety
- Development of novel and efficient delivery systems
- Rapid and sensitive pathogen detection platforms

**Gut microbiome**
- Next generation sequencing based microbiome analysis in gut health and disease
- Transcriptional profiling of probiotic mediated protective mechanisms using 3D-tissue culture, worm and animal model

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**About the PI**
Dr. Amalaradjou received her post doctoral training from Purdue University and Ph.D. from the University of Connecticut.

**Contact:**
Email: mary_anne.amalaradjou@uconn.edu
Phone: 860-486-6620
Office: #212B, George White Bldg, Storrs
The Balunas Lab investigates the chemistry and biological activity of marine microorganisms with a unique focus on the microbiology and natural products chemistry of tunicate-associated and psychrophilic marine and glacial bacteria.

**Collections**
- Arctic glacial and periglacial bacteria
- Temperate tunicate-associated bacteria
- Tropical tunicate-associated bacteria

**Other Global Health Disease Targets**
- HIV
- Antibiotics for resistant organisms
- Immunomodulation

**Contact:** marcy.balunas@uconn.edu, 860-486-3051
**Website:** http://homepages.uconn.edu/~mjb10021
My lab develops new computational methods, efficient algorithms, and powerful software tools to help answer fundamental questions in molecular evolution.

- Inferring gene family evolution through gene duplication, horizontal transfer, and loss.
- Understanding genome evolution by detecting large-scale gene duplication and highways of horizontal gene transfer.
- Reconstructing highly accurate gene trees in both eukaryotes and prokaryotes.
- Building whole-genome and multi-locus phylogenies.
- Interested in collaborating with folks studying microbial evolution, host-parasite co-evolution, plant evolution and polyploidy; and anyone requiring better computational solutions for their biological problems.
- Bansal et al., Bioinformatics (ISMB), 2012; Bansal et al., Bioinformatics, 2013; Wu et al., Syst. Biol. 2013.

About the PI
Mukul Bansal is a new faculty member with the Department of Computer Science & Engineering at UConn. Prior to arriving in Storrs, he was a postdoctoral associate at the Computer Science and Artificial Intelligence Laboratory at the Massachusetts Institute of Technology (MIT), where his mentors were Manolis Kellis and Eric J. Alm. Before joining MIT, he was an Edmond J. Safra postdoctoral fellow at the School of Computer Science at Tel Aviv University, Israel, and worked in the research group of Ron Shamir. He received the PhD degree in computer science from Iowa State University in 2009.

Contact
Email: mukul@engr.uconn.edu
Phone: (860) 486-2572
CVMDL on the UCONN campus offers veterinary diagnostic services to researchers, veterinary clinicians, agencies and others

- Microbiology services, including aerobic, anaerobic and specialty (eg aquatic) culturing
- Omnilog biochemical bacterial identification system; BioMic antimicrobial sensitivity system
- Diagnostic pathology and histopathology by board-certified veterinary pathologists
- Customized histology services for researchers
- Diagnostic PCR for infectious disease agents, including tick-borne pathogens
- Customized testing
- Questions? Ask us!!

Contact Us: CVMDL  61 N. Eagleville Road (rear entrance)

(860) 486- 3738
cvmdl.uconn.edu
Promoting the continuous production of high quality, microbiologically safe, value-added dairy products

Fill data gaps, inform risk assessments and regulation
Examine the incidence, ecology, and virulence of dairy pathogens
• Identification and characterization using molecular, biochemical and cultural techniques
• Pathogen dissemination patterns

Develop and validate methods for pathogen reduction + detection
Describe pathogen behavior during product manufacture and storage
• Validate current methods for detection and risk reduction
• Examine novel interventions

Our research has helped inform several international risk assessments and has helped shape current and future regulations and guidance for the dairy industry
Data from our projects aided in the development of novel detection methods, risk reduction interventions and technical outreach

Future work and areas for collaboration
Identification and implementation of natural preservatives for microbial control
Isolation + characterization of phages, antagonistic cultures, + their metabolites
Evaluate impact pathogens and interventions on microbial ecology

We continuously work with several partners on these goals

About the PI: As a founding member of the nations first and only comprehensive center devoted to artisan cheese, Dennis is considered one of the top experts on the microbiology of raw milk cheeses. In addition to the publication of several articles and a book chapter, he has delivered countless presentations and workshops across the globe, helped secure over $1M in external funding and received the 2012 New Achiever Alumni award from his alma mater, the University of Vermont.

Contact: ddamico@uconn.edu, (860) 486-0567, Room 212A George White Bldg.
Investigations on Mechanisms of Viral Disease and Host Protection

- Work in progress: design & delivery of mosaic T cell vaccines to control PRRS in swine (Fig. 1). Other work: recovery and identification of WNV as a cause of death of birds during winter (Fig 2). This finding confirmed that transmission of WNV could also occur in nature by means other than arthropod vectors.
- Funding primarily through USDA. Potential to benefit animal industry, vaccine industry.
- Conventional and molecular methods in virology. PCR, fluorescent and electron microscopy, FCM, EIA, WB instrumentation.
- Identification of viral pathogens in neonates. Investigate vaccines to control significant pathogens identified.

The PI received his Veterinary Medical degree from the National University of San Marcos in Lima, Peru and a Ph.D degree from Washington State University. Diplomate ACVM. USDA panel member.

Current funding: USDA-AFRI

antonio.garmendia@uconn.edu
PVS 61 North Eagleville Rd, Storrs Ct 06269 room A175A
Phone: 860-486-3945
Development of novel DNA and nanoparticle based vaccines for avian influenza (bird flu) and infectious bronchitis viral pathogens. Molecular characterization and development of novel and rapid diagnostic tests for viral, bacterial and protozoan parasites.

We have developed nanoparticle based vaccine for avian influenza virus. Efficacy studies on novel nanoparticle based avian influenza vaccine.

- Recombinant DNA vaccines for Infectious Bronchitis virus and on going studies on IBV quasi-species phenomenon using next-generation sequencing
- We have developed multiple PCR assays for viral and bacterial pathogens, including avian influenza subtyping
- Pathogenesis of *Salmonella Enteritidis (SE)* identification of SE attachment proteins.

**About the PI**
Dr. Khan received his Ph.D. from UC Davis, is a world acclaimed expert on molecular characterization and development of DNA based rapid diagnostics assays and vaccines.

**Currently Funded from:** NIFA-USDA, USAID, NSF, Charles River, China Government

**On going collaborations with the departments of:** Computer Engineering, and MCB UCONN; University of Delaware; and Research Institute in China

**Contact:**
Email: mazhar.khan@uconn.edu
Phone: 860-486-0228
Microbial Community Ecology of Host-Microbe Symbioses
Jonathan Klassen
Department of Molecular and Cell Biology

My lab studies how interspecific interactions in symbioses affect community function

- My lab uses the fungus-growing ant symbiosis as a model to understand microbial community ecology
- This symbiosis comprises ~10-20 partners, many of which differ in their population structure and ecology. We want to understand how these co-evolve as functional communities.
- We use both environmental and pure culture genome sequencing to study evolution with population-level resolution
- Genomic inferences are tested in vitro using bioassays and chemical biology
- The molecules responsible for these interactions are identified for drug discovery, both chemically and genonomically

About the PI: Dr. Klassen is a new faculty member starting at UConn Aug 2013. He received his PhD from the University of Alberta (Canada) and did his postdoctoral research at the University of Wisconsin-Madison as an NSERC (Canada) Postdoctoral Fellow.

Contact: Email: jonathan.klassen@uconn.edu; Website: www.jonathanklassenlab.com; Twitter: @klassenlab; Lab location: TLS 279; Phone: 860-486-6890
Our studies are aimed to detect and to understand viral genetic determinants of virulence.

- We have focused our studies on two animal viruses that cause highly significant diseases in swine: Classical Swine Fever Virus (CSFV), a foreign animal disease, and Porcine Reproductive and Respiratory Syndrome Virus (PRRSV), an endemic disease in the US.

- As a result of our research we have obtained genetically modified viruses that eventually can be used as improved vaccine candidates against CSFV. Those recombinant vaccine candidates and methods used to obtain them are protected by several patents granted by USPTO:

- Funding: USDA, Plum Island Animal Disease Center, National Pork Board, Storrs Agricultural Station.

- Our research is of interest to the Animal Health industry such as vaccine and diagnostic companies.

- In our research we use a combination of methods including: reverse genetics, genomics, protein-protein interactions, flow cytometry, protein expression (baculovirus) and animal studies in swine.


About the PI:
Dr. Risatti received a DVM from Argentina and MS and Ph.D. from the University of Nebraska; he is currently funded through USDA, Plum Island Animal Disease Center, and Storrs Ag. Station.
Design and development of safer and efficacious next-generation vaccines and therapeutics

- Research focus – safe and effective human and animal vaccines and viral vectors; viral pathogenesis, immunology, and immuno-modulation; biodefense; oncolytic viral therapy and gene therapy.

- Developed a number of replication-inducible and repressible vaccinia virus vectors with improved safety (US Patent Application 2013/0171189).

- Experience with a number of viral vectors, animal models of infectious diseases, epitope-based vaccines, polyvalent vaccines, synthetic biology.

- Future interests – open to collaborations (now looking to work with human tumor xenografts in immuno-compromised mice to test the effectiveness of new vaccinia virus oncolytic vectors).


Dr. Verardi received his PhD from UC Davis and is a member of the Center of Excellence for Vaccine Research (CEVR) at UConn. His research is funded primarily by NIH and USDA.

Contact: Paulo Verardi * paulo.verardi@uconn.edu * http://www.patho.uconn.edu/people/faculty/indever.html * 860-486-3420 * Atwater Building Room A175-B *
Structure-based Design of Novel Antibiotics

Co-crystal structures of dihydrofolate reductase (DHFR) aid the design and synthesis of potent, selective inhibitors

Evaluate in Cells and Enzymes:
Gram-positive bacteria (MRSA)
Gram-negative bacteria (K. pneumoniae and E. coli)
Fungi
Resistance
In vivo efficacy
Metabolism

Milestones:
Achieved in vivo efficacy with oral delivery targeting MRSA infection

Funding: NIH (R01, STTR)

Amy Anderson
amy.anderson@uconn.edu
PBB 634, 486-6145

http://homepages.uconn.edu/~ama05016/
We study the ecology of oral microbial communities in relation to oral diseases. We combine clinical studies with in vitro and animal models to understand the taxonomic and functional shifts of oral microbial communities in health and disease.

Projects:
- The oral microbiome during cancer chemotherapy and its relationship to oral mucositis
- Ecology of subgingival microbial communities in health and periodontitis

Research tools and technologies:
- 16S rRNA amplicon high throughput sequencing
- Continuous culture techniques (chemostats and flow cells)
- Periodontitis mouse model

Recent Publications:

Patricia Diaz (DDS, PhD) is Assistant Professor at UCHC. She is a periodontist and microbiologist.

Funding sources for the Diaz Lab include NIDCR/NIH and Colgate-Palmolive Inc.

Contact Us: pdiaz@uchc.edu, http://diazlab.uchc.edu/index.html
Mission Statement
“The elucidation of the mechanisms of pathogenesis of, and immune responses to, primary bacterial and viral pathogens with the goal of developing safe and effective vaccines”

Current Research
Comparative genomic and transcriptomic analyses of pathogenic Mycoplasmas.

Investigations into: cytadherence molecules and host cell receptors, as well as analysis of variably expressed surface lipoproteins and their roles in immune evasion.

Vaccine development and immunologic and genetic means of detection (DIVA tests) of these pathogens.

Investigations into host cell signatures that integrate into, or remain tightly associated with, Vaccinia virus (as a model for Variola, smallpox), and how they may be useful for attribution purposes in the event of a release of smallpox as a bioweapon.

Selected References


About the PI: Dr. Geary received his Ph.D. from UCONN in 1980 and was a Postdoctoral Fellow in the Medical Microbiology department at the University of Missouri School of Medicine. He is the Department Head of Pathobiology & Veterinary Science and is currently funded by the NIH, USDA and DTRA

Contact Us: Steven J. Geary; steven.geary@uconn.edu; http://patho.uconn.edu/people/faculty/indeste.html
BioMass Laboratories
Richard S. Parnas
Department of Chemical & Biomolecular Engineering
Polymer Program, Institute of Materials Science

Convert waste biomass into fuels, chemicals, and construction materials

- Environmental remediation, renewable energy, damage tolerant construction, revenue generation
- Novel reactors, fermentations, surface chemistry, catalysts, and composites
- Ongoing projects with wastewater treatment, biodiesel production, food services, and agricultural operations

Richard Parnas is Professor of Chemical Engineering at UConn and CTO of RPM Sustainable Technologies. He held a Fulbright Fellowship at KU Leuven (Belgium) in 2000-2001 and directed the Polymer Composites Group at NIST in the 1990’s. A book, several patents and over 100 publications document his contributions.

We currently work with Torrington, CT; Waterbury, CT; St. Etienne, France; Siemens Corp.; Proflow Inc.; Wright Pierce Inc.; Biomass Energy Solutions, LLC; Mississippi State U.

Contact
rparnas@ims.uconn.edu
Research on Resistance, Killing and Germination of Spores of Bacillus Species

- Major question we are working on answering is: What is/are the mechanism(s) of bacterial spore germination at the molecular level?
- We use molecular biology, bacterial physiology, light and fluorescence microscopy, spectroscopic analyses of the germination of individual spores, structural biology (X-ray crystallography), protein chemistry and analyses of site directed mutants
- Would like to collaborate with people interested in expressing membrane proteins and analyzing their function
- Recent papers include:
  - Mol. Microbiol. 89:113-122
  - J. Bacteriol. 195:3009-3021
  - J. Bacteriol. 195:1484-1491

Board of Trustees Distinguished Professor; currently funded primarily by US Dept of Defense
Developing third generation Live-Attenuated Vaccines for *Mycoplasma gallisepticum*

- Current vaccines for this poultry pathogen work fairly well, but are not well characterized and can cause pathology in non-target species
- We have made strides in understanding the correlates of immune protection, and some headway on understanding the mechanisms of immunopathology
- The poultry industry, USDA and commercial vaccine companies may be interested in our collective work (CEVR/Geary)
- qRT-PCR, in-situ hybridization, ELISA, tissue culture, chemotaxis assays (needed)
- Must understand the mechanisms by which the organism induces immunopathology before more sophisticated vaccines can be developed.

*Cytoskeletal “jellyfish” structure of Mycoplasma mobile. PNAS USA 2007 Nov 27*

Lawrence K. Silbart, MPH, Ph.D.; Vice Provost for Strategic Initiatives
352 Mansfield Road; Gulley Hall
phone; 486-1868      email: Lawrence.Silbart@uconn.edu
We create and apply computational methodologies, tools, and algorithms for the development, understanding, and optimization of microbial processes.

- **Approaches**
  - Genome-scale Metabolic Modeling
  - Network Inference/Curation
  - Machine Learning

- **Applications**
  - Drug Discovery
  - Therapeutic Optimization
  - Biofuel Production
  - Microbiome Engineering

- **Biological Systems Studied**
  - *Escherichia coli*
  - *Bacillus anthracis*
  - Termite microbiome

**About the PI**
Prof. Srivastava holds joint appointments in Chemical & Biomolecular Engineering and in Oral Oncology. He has been the recipient of an NIH Oncology Traineeship and an ONR Faculty Fellowship. He has raised over $5.5 million and is currently funded by NSF and NIH.
The goal of our research is to understand how viruses assemble.

- Many viruses assemble proteinaceous capsids with high fidelity. The interaction energy between capsid subunits is weak but the overall structure is very stable. We seek to understand how these weak interactions give rise to complex structures using bacteriophage P22 as a model system.
- We have mutants in capsid proteins that result in changed capsid forms – these make tubes or petite capsids.
- P22 is easy to work with in vitro. We can assemble particles by mixing pure proteins and mimic all the in vivo processes in vitro.
- P22 is being used in development of bio-nanocontainers.

This work is supported by the National Institutes of Health, GM076661

Contact Us: Carol Teschke* teschke@uconn.edu*
teschke.uconn.edu* 860-486-3992* BPB225*
Our mission is to elucidate the molecular mechanisms by which bacterial pathogens cause disease in humans

Projects:
- Understand how environmental signals regulate bacterial virulence gene expression
- Understand how bacterial effectors interfere with host signaling pathways
- Develop novel strategies to prevent and treat bacterial infection

Approaches:
We use various approaches including bacterial genetics, cell biology, biochemistry and animal models to investigate the molecular mechanisms of bacterial pathogenesis with an ultimate goal of developing novel strategies for the prevention and treatment of bacterial infectious diseases

A: SEM of microvilli elongation induced by *V. parahaemolyticus*; B: Confocal microscopy of actin-containing microvilli association with *V. parahaemolyticus*; C: Proteomic analysis of proteins secreted by *V. parahaemolyticus*

About the PI
Xiaohui Zhou is a microbiologist with experiences on bacterial genetics, host signaling modulation by bacterial virulence factors and bacterial gene regulation in response to environmental signals. Xiaohui Zhou was awarded a research fellowship from New England Regional Center of Excellence (NERCE). He is seeking collaborations on researches focusing on reduction of the contamination of foodborne pathogens in food product, interactions between pathogens and microbiomes in the gut, comparative genomics and proteomics, host-pathogen interactions.

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Rachel Burns
Clinical Assistant Professor of Pathobiology and Veterinary Science

Rachel Burns joins the UConn faculty from the San Diego Zoo Institute of Conservation Research, where she served as a veterinary pathology fellow for almost 3 years after completing her residency. Her focus as a diagnostic anatomic pathologist has been primarily on diseases of non-domestic, zoo and wildlife species, and she is particularly interested in infectious diseases. Her publications include a natural disease study of shelter cats with upper respiratory disease, a case series of turtles with tumoral calcinosis and a case report of systemic tetratrichomoniasis in a pelican. She received her DVM from the University of Georgia, College of Veterinary Medicine, in 2007 and was board-certified by the American College of Veterinary Pathologists in 2010.
David Benson lab

- Biogeography of microbial symbionts
- Geno-, transcript-, prote- and metabol-omics of symbiosis
- Actinorhizal plant root nodule symbiosis
- Microbial ecology of cheese
- Biosecurity and Science Policy