

# Bacterial Adaptation & Response Networks (BARN) ...

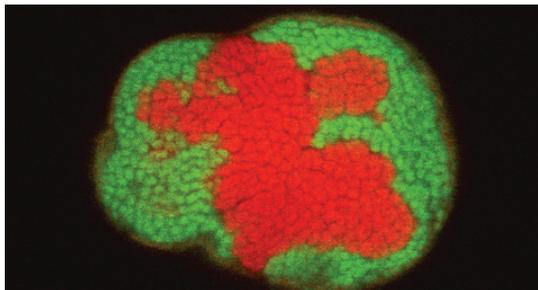


## Research Strengths & Facilities

The Bacterial Adaptation and Response Networks Research Group includes members from the departments of Biochemistry & Molecular Biology, Microbiology & Immunology and Zoology.

This group comprises individuals with experience and expertise in a broad range of disciplines, including:

- Bacterial Pathogenesis
- Biochemistry
- Bioinformatics
- Chemistry
- Genetics
- Genomics
- Microbial ecology
- Microbial physiology
- Structural biology



The common thread linking all of the group members is investigation of how bacteria adapt and respond to their environments. The environments studied are diverse, including soil and the ocean, and the human host for pathogenic bacteria. However, there are common molecular mechanisms of adaptation and response to these diverse environments. Thus, group members share common research approaches. <http://barn.lsi.ubc.ca>

## Graduate Programs

Cell & Developmental Biology (MSc, PhD)

Biochemistry & Molecular Biology (MSc, PhD)

Bioinformatics (MSc, PhD)

Microbiology & Immunology (MSc, PhD)

Zoology (MSc, PhD)

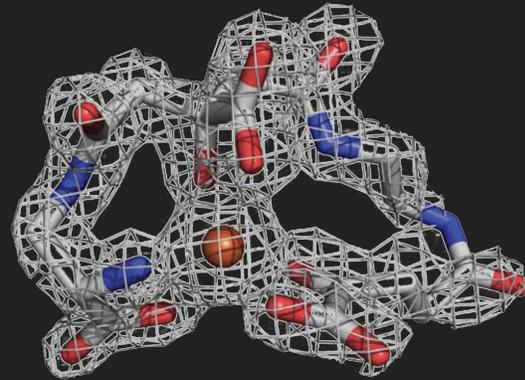
Understanding gained from the study of one adaptation or response network is applicable to others. Adaptation and response mechanisms of particular interest to this group include:

- (1) genetic regulatory networks
- (2) transport of molecules across membranes and cell walls
- (3) horizontal gene transfer

Investigations of these fundamental mechanisms benefit from great intellectual and infrastructural synergy. Further, these fundamental mechanisms also occur in multicellular organisms, making bacteria excellent experimental systems for developing broadly applicable knowledge.



# ...how bacteria adapt, respond to their environments, & cause disease.



## BARN Researchers:

**J. Thomas Beatty:** virus-like gene transfer agents; photosynthetic pigment-protein complexes

**Sean Crowe:** geomicrobiology

**Franck Duong:** essential process of protein transport

**Lindsay Eltis:** bacterial degradation of aromatic compounds and steroids, including lignin & cholesterol

**Rachel Fernandez:** molecular pathogenesis of *Bordetella pertussis*: biogenesis and immunomodulatory properties of the outer membrane

**Erin Gaynor:** molecular pathogenesis of foodborne human pathogens

**Steven Hallam:** microbial systems ecology and functional metagenomic screens

**George Mackie:** the properties of the relevant enzymes and RNA chaperones, the functional state of the mRNA and the secondary or tertiary structure of the RNA substrate determine its fate

**William Mohn:** ecology of forest soil and gut microbial communities; bacterial steroid metabolism

**Michael Murphy:** mechanism of iron homeostasis in pathogenic bacteria

**Rosemary Redfield:** the ability of *Haemophilus influenzae* to take up DNA from their surroundings

**John Smit:** biotechnology applications using the S-layer of *Caulobacter*

**Charles Thompson:** regulation of bacterial gene expression associated with tuberculosis

## Recent Publications

Fogg PC, Hynes AP, Digby E, Lang AS, Beatty JT. (2011). Characterization of a newly discovered Mu-like bacteriophage, RcapMu, in *Rhodobacter capsulatus* strain SB1003. *Virology* 421:211-221

Murakami T, Burian J, Yanai K, Bibb MJ, Thompson CJ. (2011). A system for the targeted amplification of bacterial gene clusters multiplies antibiotic yield in *Streptomyces coelicolor*. *PNAS* 108:16020-16025.

Roberts JN, Singh R, Grigg JC, Murphy ME, Bugg TD, Eltis LD. (2011). Characterization of dye-decolorizing peroxidases from *Rhodococcus jostii* RHA1. *Biochem* 50:5108-5119.

Lin AE, Krastel K, Hobb RI, Thompson SA, Cvitkovitch DG, Gaynor EC. (2009). Atypical roles for *Campylobacter jejuni* amino acid ATP binding cassette transporter components PaqP and PaqQ in bacterial stress tolerance and pathogen-host cell dynamics. *Infect & Immun* 77:4912-4924

Marr N, Novikov A, Hajjar AM, Caroff M, Fernandez RC. (2010). Variability in the lipooligosaccharide structure and endotoxicity among *Bordetella pertussis* strains. *J Infect Dis* 201:1897-1906.

Garrey SM, Mackie GA. (2011). Roles of the 5'-phosphate sensor domain in RNase E. *Mol Microbiol* 80:1613-1624.

Reaves ML, Sinha S, Rabinowitz JD, Kruglyak L, Redfield RJ. (2012). Absence of detectable arsenate in DNA from arsenate-grown GFAJ-1 cells. *Science* 337: 470-473

Wright JJ, Konwar KM, Hallam SJ. (2012). Microbial ecology of expanding oxygen minimum zones. *Nature Reviews Microbiol* 10: 381-394.

## Graduate Studies Admission

UBC Faculty of Graduate Studies establishes common minimum academic requirements. One of the major requirements for LSI graduate programs is securing a research supervisor.

## Contact

Recruitment & Outreach Coordinator  
lsi.grad@ubc.ca  
website: grad.lsi.ubc.ca

## Grad School @ UBC

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## The University of British Columbia

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