



# Virginia Tech

VIRGINIA BIOINFORMATICS INSTITUTE  
AT VIRGINIA TECH

Fralin Life Science Institute



# Virginia Bioinformatics Institute



# VBI - Core Laboratory Facility

Resource dedicated to the development and application of various high-throughput technologies, including:

- Next generation sequencing (Sure Select)
- Gene expression analysis (GWAS –Wake)
- Proteomics (Array based provider)
- Custom microbiology projects

# VBI - Data Analysis Core

Wide range of services to solve the data analysis bottleneck, including:

- Experiment design
- Data analysis
  - Gene chip arrays (Affy, NimbleGen, custom)
  - NextGen sequencing
    - Genome assembly/mapping
    - Gap closure (affinity/primer design)
    - Gene prediction
    - Variation/allele discovery
    - Comparative genomics
    - GO analysis
    - Visualization
- Data sharing and hosting (with CCF)
  - Blast site hosting
  - Project site hosting

# VBI - Core Computational Facility

Provides a secure, stable, and manageable infrastructure supporting data-intensive research, offering:

- Server (dedicated and shared/virtual) hosting (>200)
- High-performance computing (multiple machines, large core number, large RAM, FPGA, GPGU, etc)
- Storage and backup (500 TB spinning disk, offsite backup)
- Database hosting (BLAST)
- Data support
- Enabling services to support research collaborations

# VBI – accessing resources

- For-fee services as cost recovery under A-21
  - Costs reviewed either annually or semi-annually
- Fed Ex, PO, FTP, snail mail, personal courier, ...
- [www.vbi.vt.edu](http://www.vbi.vt.edu)

# Virginia Tech Mass Spectrometry Incubator

Mass spectrometry facility to enhance research in metabolomics/proteomics

- Instrumentation
  - 4800 MALDI TOF/TOF
  - 4000 QTrap
  - 3200 Qtrap
  - API 3200
  - DESI ion source
- Equipment and expertise is made available to *all* researchers on the Virginia Tech campus.
  - Between 40-50 Principal Investigators/year.
- Equipment operated as a resource that integrates both research and education.

# Virginia Tech Mass Spectrometry Incubator

- University support defrays some maintenance and upgrade costs associated with the equipment (presently \$100K/yr)
- Heavy users **must** incorporate costs associated with continued operation of the incubator in their extramural funding requests (Co-PI or Supporting roles).
  - 8 active DOE, NIH, NSF projects (3 as Co-PI, 5 as Supporting role).
  - Metabolomics and proteomics projects (generally targeted).
- Collaboration with other institutions (predominantly undergraduate) encouraged.



# Virginia-Maryland Regional College of Veterinary Medicine

## Selected service centers and contacts:

- Morphology Lab – Kathy Lowe (540)-231-4811
  - <http://www.vetmed.vt.edu/research/resources/profiles/morph.asp>
- Flow Cytometry Core – Melissa Makris (540)-231-4115
  - <http://www.vetmed.vt.edu/research/resources/profiles/flow.asp>
- Teaching and Research Animal Care Support Service (TRACSS) - Pete Jobst (540)-231-7599
  - <http://www.vetmed.vt.edu/research/tracss/>
- Toxicology – Geraldine Magnin-Bissel (540)-231-4835
  - <http://www.vetmed.vt.edu/research/resources/profiles/tox.asp>
- GLP and QA program – Sandy Hancock (540)-231-4817
  - <http://www.vetmed.vt.edu/research/resources/profiles/qau.asp>

## Others:

- <http://www.vetmed.vt.edu/research/resources/profiles.asp>

# VMRCVM Morphology Lab

College of Veterinary Medicine  
Virginia Tech

- The VMRCVM Morphology Lab is equipped to support electron microscopic investigations of research and/or clinical specimens in the life sciences. It functions as the life-sciences facility for the College and for the entire campus; and serves also the needs of commercial entities in the Commonwealth and beyond. We also provide diagnostic support to veterinary clinics when requested.

# Morphology Lab Core Equipment

College of Veterinary Medicine  
Virginia Tech

- Pair of Electron Microscopes: Zeiss 10A transmission EM & Zeiss SVO-40 scanning EM
- There is a full complement of ancillary equipment for the processing and handling of submitted specimens, and a skilled technical staff member who prepares samples for investigators to use.
- We make the equipment and the lab's services available to all users on the basis of a fee schedule that is revised yearly by the Controller's Office.

# Morphology Lab Staff

College of Veterinary Medicine  
Virginia Tech

- The Lab Supervisor, Ms Kathy Lowe, is a long-time employee of the College and has more than 30 years' experience with biological electron microscopy.
- Dr Thomas Caceci, a faculty member of the Department of Biomedical Sciences & Pathobiology, serves as Lab Director.
- Both are available to provide guidance and assistance to investigators on appropriate methods and approaches to research interests and budgeting guidelines for proposals.

# Flow Cytometry Core Equipment

College of Veterinary Medicine  
Virginia Tech

- Two BD FACS Aria Flow Cytometer & Cell Sorting Systems
- BD FACSCalibur Flow Cytometer
- Veritas Laser Capture Microdissection System
- Nikon LiveScan Swept Field Confocal Microscope System

# Services

## Flow Cytometry Core Equipment

- Multi-parameter analysis including (but not limited to) phenotyping, viability, apoptosis, DNA cell cycle and ploidy, cytokines, proliferation, fluorescent proteins, bead array, and morphology
- Data analysis
- Consultation
- Cell sorting
- Experiment troubleshooting
- Instrument training
- Publication quality graphics
- Lectures and Workshops
- Literature and protocol resources

# Using The Lab

## Flow Cytometry Core Equipment

- All investigators should contact Melissa Makris, the Laboratory Supervisor, at 231-4115.
- Melissa is available to run samples, analyze samples, and assist in the development of research protocols utilizing this equipment.
- Specific experiments are scheduled directly with Melissa during regular business hours
- Charges are assessed on an hourly basis.



**VIRGINIA-MARYLAND**  
REGIONAL COLLEGE OF VETERINARY MEDICINE



*Teaching and Research Animal Care Support Service*  
**TRACSS**



**VIRGINIA-MARYLAND**  
REGIONAL COLLEGE OF VETERINARY MEDICINE

**Contact: Pete Jobst**  
**(540)-231-7599**



# *TRACSS*

## Support Service

- Provides husbandry and veterinary care for all research and teaching animals in the VA-MD Regional College of Veterinary Medicine
- Provides technical support for research projects as needed
- Provides research project management including turn-key projects with identified deliverables

# *TRACSS*

## Support Staff

- Nine full-time animal care technicians
- Two full-time Licensed Veterinary Technicians
- One Clinical Veterinarian
- Direct access to Board Certified Veterinary Specialists in the VA-MD Regional College of Veterinary Medicine

# *TRACSS*

## Available Housing

- Rodents: ABSL-1, 2, and 3.
- Rabbits: ABSL-1 and 2
- Chickens/Turkeys: ABSL-1 and 2
- Dogs and Cats: ABSL-1
- Pigs, Goats/Sheep, Calves: ABSL-1 and 2
- Gnotobiotic pigs: ABSL-1 and 2

# *TRACSS*

## Research Support

- Clinical Research Support
  - Two surgical operating suites
  - One animal preparation room
  - Basic equipment available on site including ultrasound, inhalant anesthesia, pulse oximetry etc
  - Specialized equipment available in the Veterinary Teaching Hospital

# *TRACSS*

## Research Support

- Animal housing
  - Animal caging and handling equipment
  - Animal procedure areas for data collection
  - Technical and husbandry support as needed

# TRACSS

•For a fee schedule and additional information,  
please view the website

([www.vetmed.vt.edu/research](http://www.vetmed.vt.edu/research)) or contact:

Dr. Kent Scarratt, Director

[kscrat@vt.edu](mailto:kscrat@vt.edu)

540-231-7588

Mr. Pete Jobst, Animal Resource Manager

[pjobst@vt.edu](mailto:pjobst@vt.edu)

540-231-7599



# Toxicology Laboratory Resource

## What do we do?

Provide analytical support to students and faculty in their research projects.

Sample preparation (biological liquid and tissue samples, feed)

Qualitative and quantitative analysis

Enzymatic assays

## Instrumentation

Liquid Chromatography with UV-visible, fluorescence and electrochemical detection

Gas-Chromatography-Mass Spectrometry (EI, CI)

Atomic Absorption Spectrophotometry

Microplate readers with UV-visible and fluorescence detection





# Toxicology Laboratory Resource

## What can we test for?

Endogenous compounds: neurotransmitters, vitamins A and vitamin E,...

Oxidative stress: oxidized amino acids, isoprostanes, vitamin C.

Toxicants: pesticides, mycotoxins ...

Drug metabolism: cyclosporine, gentamicin, NSAID, opioids, ...

Metals and minerals (Se, Pb, Cu, Hg, Ca...)

Miscellaneous: Methemoglobin, nitrates,...

## Contact us:

Toxicologists: Dr. Marion Ehrich ([marion@vt.edu](mailto:marion@vt.edu)), Dr. Blair Meldrum ([bmeldrum@vt.edu](mailto:bmeldrum@vt.edu)),  
Dr. Denis Blodgett ([dblodg@vt.edu](mailto:dblodg@vt.edu))

Analytical chemists: Dr. Geraldine Magnin-Bissel ([gmagnin@vt.edu](mailto:gmagnin@vt.edu)), Barbara Wise  
([bcwise@vt.edu](mailto:bcwise@vt.edu))

Toxicology Laboratory (0442)

Virginia-Maryland Regional *College of Veterinary Medicine*  
Blacksburg, Virginia 24061

Phone (main lab): (540) 231-4835







# Virginia-Maryland Regional College of Veterinary Medicine

## Good Laboratory Practice Program

- ▶ The Good Laboratory Practice (GLP) Program supports faculty conducting studies or providing testing services in compliance with the federal GLP regulations. GLP regulations describe laboratory standards that must be followed to assure the quality and integrity of test data submitted to the FDA or EPA in support of applications for product research and marketing permits.
- ▶ The Quality Assurance Unit (QAU) is a functional unit of the GLP Program and a requirement of the GLP regulations. QAU staff are available to provide the following services to Virginia Tech faculty, staff and students :
  - ▶ Monitor GLP studies to assure that personnel, facilities, equipment, procedures, records and reports comply with the regulations
  - ▶ Assist laboratories in developing and implementing quality procedures for conducting GLP-compliant research
  - ▶ Provide basic GLP training

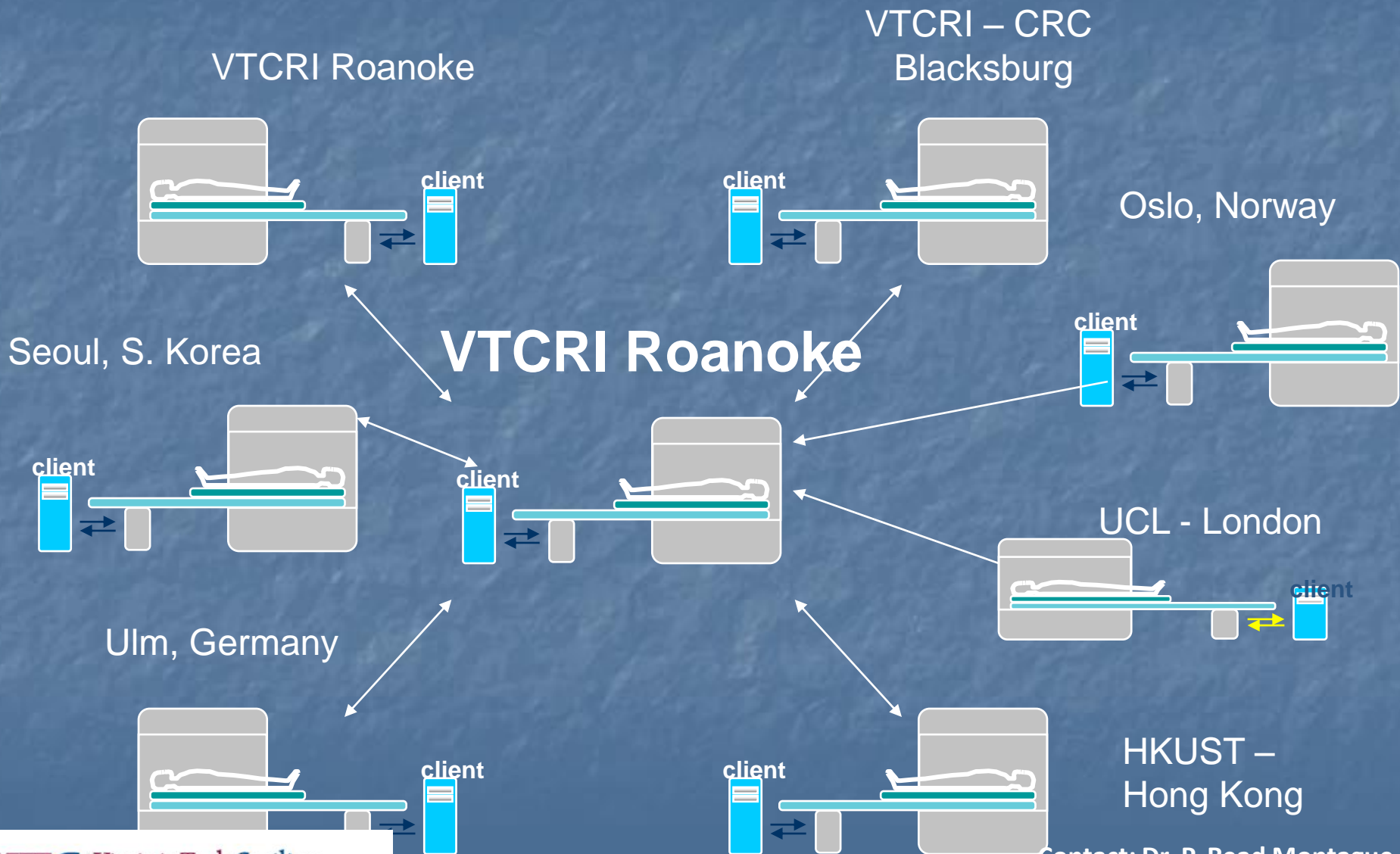
# Functional magnetic resonance imaging (fMRI)

Makes a 'movie' of microscopic blood flow changes in the brain



This technique lets us make images of functioning human brains

# World wide interactive functional brain imaging network based at VTCRI



# Virginia Tech Carilion Research Institute

- The VTCRI has three research MRIs. Two of the scanners are located in the VTCRI in Roanoke while the third scanner is sited at the main VT campus in Blacksburg.
- All 3.0 Tesla machines are configured for functional magnetic resonance imaging studies of the human brain during behavioral tasks
- The scanners are all functionally inter-linked in a “hyper-scanning” network.
- The Human Neuroimaging Lab, directed by Professor Read Montague, at the VTCRI serves as the hub for the world- wide functionally interactive human brain scanning network