DOWNTOWN CAMPUS CORES & RESOURCES

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Senior Associate Dean for Research

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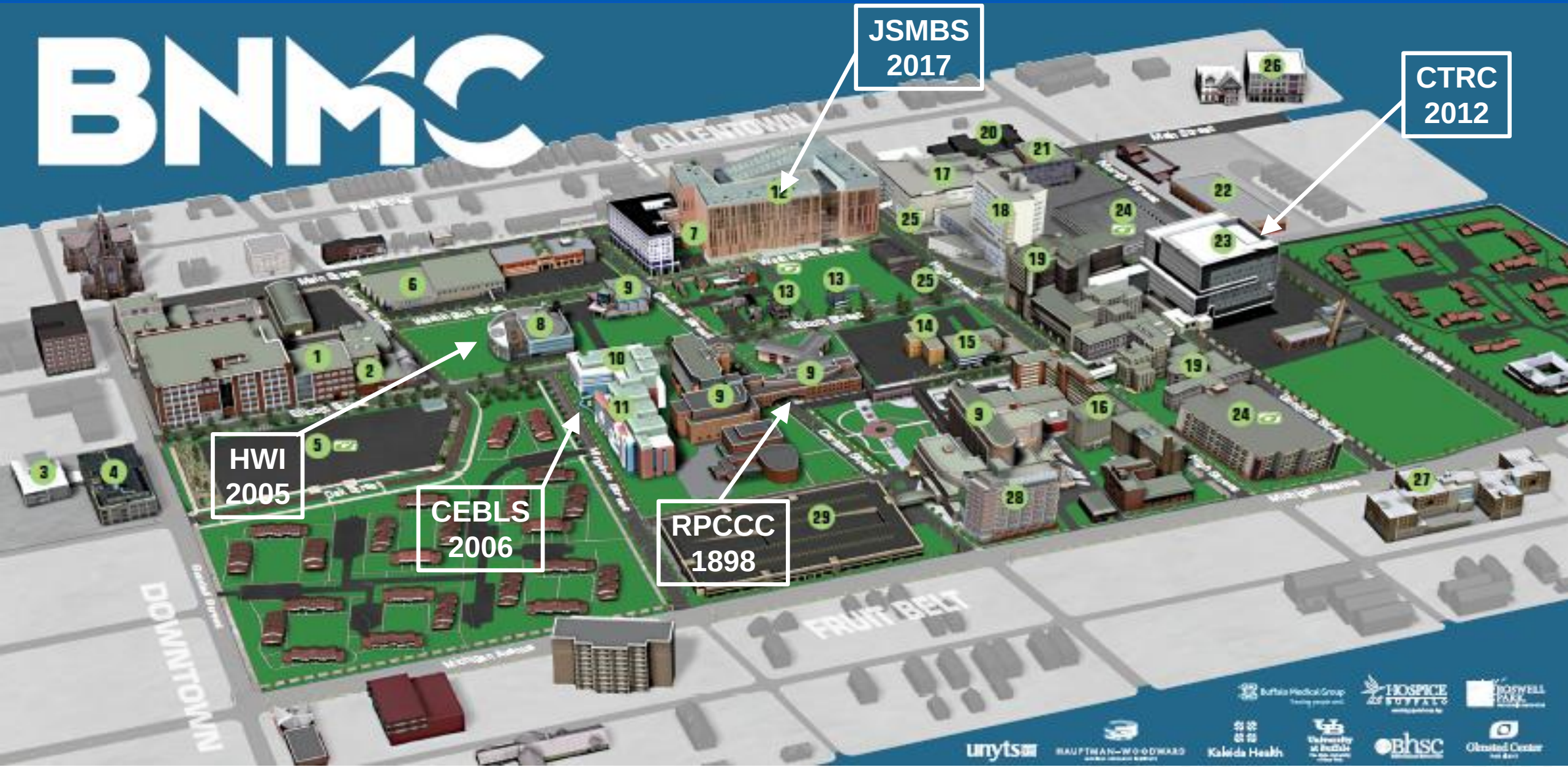
University at Buffalo

GROWTH OF THE DOWNTOWN CAMPUS



Pathology and Anatomical Sciences Research Service Center

Director, Dr. Wade Sigurdson, wjs@buffalo.edu

- Histology Core Facility
- Confocal Microscope and Flow Cytometry Facility
- Multispectral Imaging Suite
- Electron Microscopy
- Imaging Mass Cytometry

Histology Core Facility

Services include:

- Paraffin embedding & histology
- Frozen histology
- Histological stains
- Immunohistochemistry
- Immunofluorescence
- Tissue microarray
- *In situ* hybridization

Instrumentation:

- Microtomes (Leica and Olympus)
- Cryostats (Leica and Tanner)
- Sledge microtome
- Vibratome
- Leica Bond
- Leica Auto-stainer

Confocal Microscope and Flow Cytometry Facility

Instrumentation:

Imaging:

- Leica TCS-SP8 STED Falcon confocal microscope
- VTI-iSIM super resolution high speed confocal microscope
- Leica SP8 multiphoton confocal
- Leica DMI 8 inverted and DM 6B fluorescence microscope
- Leica FCA-205 fluorescence macroscope

Flow Cytometry

- Cytec Aurora spectral analytical flow cytometer
- BD FACS Celesta analytical flow cytometer
- BD FACS Aria Fusion sorting flow cytometer

Molecular Biology

- Gel docs (Westerns, Protein, DNA)
- NanoDrop Spectrophotometers
- Multiplex qPCR
- Phospho-Imager scanner

Multispectral Imaging (MSI) Suite

- MSI captures image data across ultraviolet (UV), visible, and infrared (IR) bands
- High-resolution, multi-dimensional view of tissue samples
- Improved S:N, enhanced contrast, simultaneous detection of multiple biomarkers, quantitative analysis

Services:

- Whole slide imaging for brightfield and fluorescence
- Multi Spectral imaging
- Digital image annotation
- Apollo/arc WSI database
- Training & consultation for students & faculty

Instrumentation:

- Leica DM6000B microscope with Nuance EX MSI System
- Leica Aperio VERSA WSI System
- Aperio Scanscope CS
- Pacific Image PowerSlide 5000 CCD Slide Scanner
- NX12 Atomic Force Microscope
- ImageScope software
- Annotation workstations

Electron Microscopy

Services:

- Sample preparation
- Post-embedding labeling techniques
- Cryo CLEM (correlative light electron microscopy)
- Standard transmission electron microscopy
- Ultrastructural analysis of cells and tissue

Instrumentation:

- Leica EM UC7 Ultramicrotome equipped with EM FC7 cryochamber
- Hitachi High HT7800 Res Cryo-TEM (*up to 600,000x*)
- Leica EM set mounted on Leica DM6 F5

Imaging Mass Cytometry

- Antibodies conjugated to stable, non-radioactive metals (lanthanides)
- Batch staining 40+ markers with no autofluorescence
- Co-detection of protein & RNA

Services & Instrumentation:

- Antibody-metal conjugation
- Standard Biotools Hyperion XTI (tissue sections)
- Standard Biotools Cytof XT Imaging Mass Cytometer (single-cell analyses)

Contact, Dr. Wade Sigurdson, wjs@buffalo.edu

Toxicology Research Center (Cary Hall, South Campus)

- Analytical toxicology ADME kinetics; antimicrobial testing; toxicogenomic assays.
- Contact: Dr. Kostyniak, pjkost@buffalo.edu

Institute for Healthcare Informatics (IHI)

- data repository of EMR and claims data for WNY; data access, secure storage, computing, and analytics
- Expertise in HIPAA, human subjects research, tools like i2b2, and TrinetX industry trials data
- Contact: Dr. Winkelstein, pwink@buffalo.edu

Center for Biomedical Imaging (CTRC)

- Philips MR 7700 3 Tesla MRI scanner for humans and large animals
- Bruker 9.4 Tesla Microspec MRI scanner for small animals
- Contact: Dr. Schweser, schweser@buffalo.edu

Neuropsychology Center (Coventus, 1001 Main St.)

- Development and implementation of cognitive outcome measures
- Psychometric testing to track personality traits, psychiatric symptoms, cognitive functions
- Contact: Dr. Benedict, benedict@buffalo.edu

Why use the UB Biorepository?

- Remain competitive and stretch research dollars by not duplicating infrastructure for biobanking operations
- Processing services that ensure data quality and regulatory compliance

Norma Nowak, PhD – Director
John Tomaszewski, MD – Medical Director
Donald Yergeau, PhD – Associate Director
Trevor Ralph, MS – Biobank Lab Manager

Sample collection and processing:

- Two REVVITY Chemagic 360 for automated nucleic acid extraction
- Hamilton Easyblood and STAR for biosample fractionation, processing and aliquoting
- Control rate freezer for cryopreservation

Quality control analysis :

- Agilent Tapestation 4200 for nucleic acid qualification.
- Unchained Labs Lunatic for biosample concentration and quality
- VolumeCheck instrument for sample volume confirmation quality.

Storage facility:

- 4°C, -20°C, -80°C freezers, automated Azenta LN2 biostore
- ISO temperature monitoring system (REES Scientific).
- 120,000 bio-samples stored / capacity of 900,000 + samples.

Workflow automation:

- Agilent SLIMS sample management.
- Qualityze document management.

Contact: biorepository@buffalo.edu

UB Genomics and Bioinformatics Core

Norma Nowak, PhD – Director

GENOMICS LAB SERVICES:

Donald Yergeau, PhD – Associate Director

- Manual or Automated Nucleic acid purification
- DNA/RNA/miRNA Quality Control Services using Qubit Fluorescence and Agilent Fragment Analyzer
- Next Generation Sequencing Library preparation (WGS, WES, RNAseq, ChIPseq, COVID, Epigenetics, Microbiome)
- High Throughput Sequencing (Illumina short read and Oxford Nanopore long read)
- Single Cell Transcriptomics, Single Cell Immune Profiling, Single Cell Multiome (scGEX and scATACseq) from 1000 to 1 million cells or nuclei
- Spatial Transcriptomics using VISIUM (fixed or fresh/frozen tissue) and XENIUM RNA *in situ* technology
- Project Consultation/Budget/Grant

BIOINFORMATICS SERVICES:

Jonathan Bard, PhD – Associate Director

- Sequencing quality metrics (Fastqc, Fastq_screen, multiQC)
- Massively parallel processing using SLURM/CCR
- Storage and distribution of sequence data
- Full suite of open-source analysis packages installed
- Rapid build out of new pipelines to meet demand
- Can also push results to Illumina BaseSpace Apps
- Custom programming in R and Python
- Project Consultation/Budget/Grant

Contact, cbi-ubgbc@buffalo.edu

Mass Spectroscopy Core

- Specializes in proteomics, PK/PD, lipidomics and metabolomics
- Three mass spectrometers: high resolution Themo Lumos ETD, Thermo Quantiva triple-quad, and Thermo Altis

Center for Computational Research

- High-performance and Cloud computing
- Remote visualization capabilities

ISO 6- and ISO 7-certified cleanrooms

- microfabrication, thin film processing, photolithography, and materials characterization

Contact: Smitha James, srjames@buffalo.edu

Cryo-Electron Microscopy Center

- Thermo Fisher Glacios 200 kV microscope with a Volta phase plate, Falcon 4 Detector, Ceta-D camera for micro-crystal electron diffraction, and a Thermo Fisher Vitrobot for grid preparation

National Crystallization Center

- SPTLabtech Mosquito with LCP, Formulatrix NT8, Art Robbins Gryphon, Integra ViaFlo 384/96, Formulatrix Formulator, and several Formulatrix Rock Imagers to determine initial crystallization conditions, providing rapid screening of over 1500 crystallization conditions

Synchrotron Services

- HWMRI manages the Industrial Macromolecular Crystallography Association Collaborative Access Team (IMCA-CAT) beamline for high-throughput high-quality single-crystal studies

Contacts:
Sarah EJ Bowman, PhD, Director of the Crystallization Center sbowman@hwi.buffalo.edu
Devrim Acehan, PhD, Director of CryoEM Center dacehan@hwi.buffalo.edu

- Advanced Tissue Imaging
- Bio analytics Metabolomics & Pharmacokinetics
- Bioinformatics and Biomedical Research Informatics
- Biostatistics and Statistical Genomics
- Drug Discovery
- Flow and Immune Analysis
- Gene Modulation
- Gene Targeting and Transgenics
- Health Communications
- Nicotine and Tobacco Product Assessment
- Scientific Editing and Research Communications
- Translational Immuno-Oncology

Contact: Amy Troutman, Amy.Troutman@RoswellPark.org