STTARR

The Spatio-Temporal Targeting and Amplification of Radiation Response Innovation Centre provides state-of-the-art imaging technology for cellular studies for DNA and proteins, multi-modality imaging of pre-clinical models, and correlative pathology lab in an integrated environment.

Service Department(s): Research Communications

STTARR Core I, Cellular

The Cellular Core of STTARR supports DNA repair assays coupled to genomic and proteomic testing for the prediction of radiation response and toxicity. In addition to our support given to both basic and clinical studies relating to genetic instability and cancer risk, our infrastructure also provides a thriving scientific environment ideal for R&D and new drug feasibility studies as service or as laboratory space provided to pharmaceutical and product development companies. The facility is led by Scientific Director **Dr. Rob Bristow**.

- Available Equipment
  - Spinning disk confocal microscope for tracking nuclear DNA repair complexes
  - PCR and qRT-PCR apparatuses
  - DNA, RNA and protein analyses apparatuses
  - Quantitative fluorescent COMET assay for measuring DNA damage
  - Level 2 tissue culture facility
  - Radioisotope laboratory for in vitro and metabolic labelling
  - Prostate and bladder cancer xenografts endpoints for preclinical testing of novel agents
  - Microenvironmental chambers to assess the effects of hypoxia on cellular models
  - MesoScale Discovery Sector Imager 2400 for multiplex immunoassays for cytokine and proteomic studies during cancer therapy
- Unique Capacities
  Core I includes state-of-the-art microscopes for high-resolution longitudinal imaging of molecular processes within cells. It also includes equipment for gene and protein expression studies in patient tissues.

  The proximity of Core I to the other Cores allows STTARR to more quickly assess the effectiveness of preclinical and clinical molecular agents. This helps researchers to quickly identify what Phase I agents can be used with radiotherapy.

  Specialized facilities contained within this Core include:
  - Access to serum and tissue proteomic testing
  - Preclinical and clinical tissue microarrays for correlative science studies
  - Preclinical tumour and normal tissue assays for assessing efficacy and toxicity of novel

cancer agents
    - Immunohistochemical staining for radiation response pathways
    - Microenvironmental facilities to measure radiation responses
    - Specialized microscopy and image analysis facilities for live cell imaging studies
    - DNA repair assays
- Using the Facility
    - Booking time on the microscopes is available to academic and external users
    - The availability of the equipment for collaborative research may vary according to the nature and scope of ongoing projects

Usage Arrangements
    - Collaborative and/or user fee; contact STTARR for costing estimates
    - STTARR pricing structure can be found here: **http://www.sttarr.ca/pricingstructure.pdf**
- Contacts

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http://www.sttarr.com/contact

STTARR Core II, Preclinical

The preclinical core of STTARR is designed to advance the development and rapid translation of novel biologic imaging and targeted radiation treatment strategies in various animal models. The facility is led by Scientific Director **Dr. David Jaffray**.

- Available Equipment
    - Volumetric micro-computed tomography (GE Locus Ultra microCT)
    - High resolution specimen micro-computed tomography (Siemens Inveon microCT)
    - 7T magnetic resonance imaging and spectroscopy (Bruker 30 cm 7T MRI)
    - 1T magnetic resonance imaging (Aspect Imaging)
    - Micro-positron emission tomography (Siemens Focus 220 PET)
    - Single photon emission computed tomography with CT (Bioscan nanoSPECT/CT)
    - Image-guided radiation treatment unit (Precision X-RAY XRAD 225Cx micro-IGRT) with conebeam CT and a bioluminescence camera
    - Optical imaging: bioluminescence and fluorescence (Xenogen IVIS Imaging System 100,VisEn FMT2500, CRi Maestro, Leica FCM1000 Fluorescent Con-Focal Microscope, LCD tunable filter camera) and biopsy guidance (NDI Polaris Optical Tracking)
    - Small animal ultrasound (VisualSonics Vevo 2100 system) with photoacoustic capabilities (VisualSonics LAZR system)
- Unique Capacities
    - Equipped to support small animal imaging studies
    - Multimodality imaging with co-registration and analysis
    - Option of using multimodal contrast agents/probes (optical/CT/MRI/PET)
    - Availability of a variety of radionuclides and radiopharmaceuticals
    - New magnetic resonance imaging technologies for thermometry, cell tracking, contrast

agent development and surgical intervention
    - Planar (hyperspectral) and 3D volumetric optical fluorescence tomographic imaging using novel optical fluorescence agents
    - Quantitative 3D fluorescence imaging of murine models (VisEn FMT system)
- Using the Facility
    - Open to academic and external users
    - Training and technical support is available

Usage Arrangements

Collaborative and/or user fees; please contact STTARR for cost estimates for budgetary purposes and to inquire about our competitive price structure.

- Contacts

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STTARR Research Program Manager

Deborah Scollard
Core II Manager

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STTARR Core III, Clinical

The Human Imaging and Precision Radiation Facility Core tests novel biologic imaging and treatment strategies in the clinic with the aim of providing rapid feedback to Cores I and II to accelerate the integration of these strategies in the clinic.The facility is led by Scientific Director **Dr. Michael Milosevic**.

- Available Equipment
    - Multi-slice CT simulator
    - PET-CT
    - 1.5T MR simulator
    - High resolution 3D ultrasound imaging
    - Optical and bioluminescence imaging
    - Precision image-guided flat-panel cone-beam CT treatment units
    - Stereotactic radiation treatment units
    - Pulsed-dose-rate and high-dose-rate brachytherapy facilities
    - Comprehensive, integrated radiation treatment planning and image analysis platforms for external beam radiotherapy and brachytherapy
- Unique Capacities
    - Development of new magnetic resonance technologies for cell tracking (1.5T MR scanner + Rutt coil)
    - PET-CT imaging
- Using the Facility
    - Open to academic and external users
    - The availability of the equipment for collaborative research may vary according to the nature and scope of ongoing projects

Sample Preparation
Please contact us for more information

Usage Arrangements
- Collaborative and/or user fee; please contact STTARR for costing estimates
- STTARR pricing structure can be found here: **http://www.sttarr.ca/pricingstructure.pdf**

- Contacts
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STTARR Core IV, Image Analysis and Registration

The Image Analysis and Registration Core uses multi-modality imaging for longitudinal studies of radiation response in cellular, animal and human domains. The facility is led by Scientific Director **Dr. David Jaffray**.

- Available Equipment
  - Imaging Software: ClearCanvas, Inveon Research Workplace, Amide, Microview, Amira, Matlab
  - Pathology Software: Definiens, ImagePro Premier, Imagescope, ImageJ, Matlab
  - Online storage for ongoing projects
- Unique Capacities
  - Tumour and normal tissue delineation comparisons can be quantified within a single sample,across observers or compared to auto-segmentation algorithms for single or multi-modality imaging
  - Imaging processing capabilities include respiratory sorting of temporal images using kinetic modelling, response assessment and quantitative evaluation
  - Multichannel pathology slide scanning and registration
  - STTARR has acquired Definiens TissueStudio image analysis software not only for experts,but for non-technical users in order to quantify their imaging projects. A set of basic, yet powerful analysis algorithms and tools help IHC and IF image quantification by performing cell by-cell, nuclear and spot counting, and marker analysis
- Using the Facility
Open to academic and external users.

Sample Preparation
Please contact us for more information.

Usage Arrangements
- Collaborative and/or user fee
- Contact STTARR for costing estimates s
- Pricing structure can be found here: **http://www.sttarrtmp.com/home/access**

/pricing/core4

- Contacts

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STTARR Core V, Pathology

The Pathology Core focuses on histopathology and molecular pathology results correlated with *in vivo* imaging. The facility is led by Director Dr. Theo van der Kwast.

For more information about STTARR Core V, please visit their **webpage**.

Quick Links

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- **Booking Calendar**
- **STTARR Core I, Cellular**
- **STTARR Core II, Preclinical**
- **STTARR Core III, Clinical**
- **STTARR Core IV, Image Analysis & Registration**
- **STTARR Core V, Pathology**

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