

# 7a.019.DU - Image Informatics for the Characterization of Molecular Subtypes in Breast Carcinoma Tissue

## Project - Team

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## Project - Description

Histological examination of tumor and biopsy specimens remains the key diagnostic tool for pathology diagnosis and staging. The availability of large-scale architectural information and fine-scale features can serve as important cues from which to judge the aggressiveness of the tumor and the patient's prognosis. The predictive capabilities of histological image analysis, enhanced by informatics techniques, may be harnessed to objectively and reproducibly distinguish tumor subtypes. The key advantage of this approach tackles the two major criticisms of molecular subtyping: 1) the lack of spatial information, that makes gene expression analysis susceptible to artifacts in the presence of tumor heterogeneity, can be overcome with image analysis; 2) by defining tumor molecular subtype morphologically with a reduced number of variables (on the order of tens, rather than thousands), the "curse of dimensionality" no longer places a constraint on our ability to define groups based on pattern analysis.

## Project - Novelty of Approach

In comparison to molecular techniques, which have not proven to be reliable, we aim to develop subtyping methods based on image analysis of histologic tissue. The central hypothesis of our work is that histological images contain information that can objectively be utilized to classify tumors into distinct molecular subtypes. We further hypothesize that these subtypes consist of an elaboration of existing subtypes discovered using IHC and gene expression analysis, and that many more subtypes exist than have previously been characterized. These morphological subtypes likely consist of morphological variants of existing subtypes as well as previously-undiscovered subtypes.

## Project - Deliverables

	Deliverable
1	Novel algorithms for molecular subtype identification and prediction of genetic traits from visual tissue analysis
2	Implemented prototype software
3	Research publications

## Project - Benefits to IAB

- 1) Extension of our biomedical image informatics framework.
- 2) Techniques that will help IAB members classify tissue samples to improve/personalize patient care

## Attention Project PIs

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## Spaces

- All Spaces

	CVDI 2017 IAB Fall Meeting				
	CVDI 2018 IAB Fall Meeting				
	CVDI 2018 IAB Spring Meeting				
	CVDI 2019 IAB Fall Meeting				
	CVDI 2019 IAB Spring Meeting				
	CVDI Calendar				
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and specimen analysis.

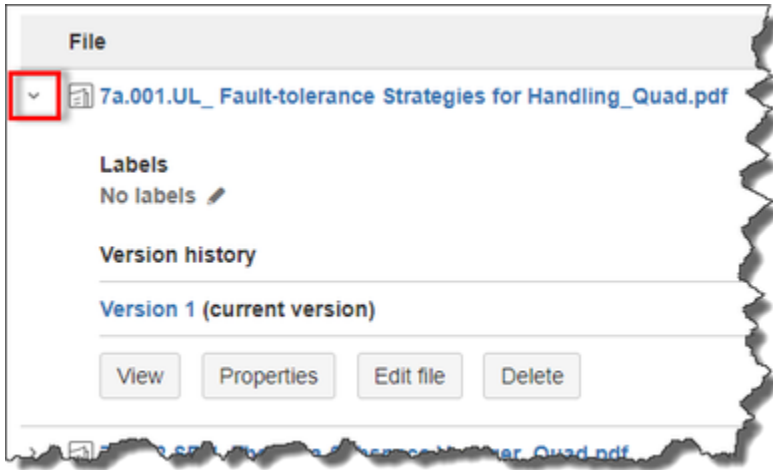
### Progress to Date

We have developed a general image analysis and informatics framework that is capable of predicting histologic grade and metastasis status of breast tumors. The proposed work builds on this framework.

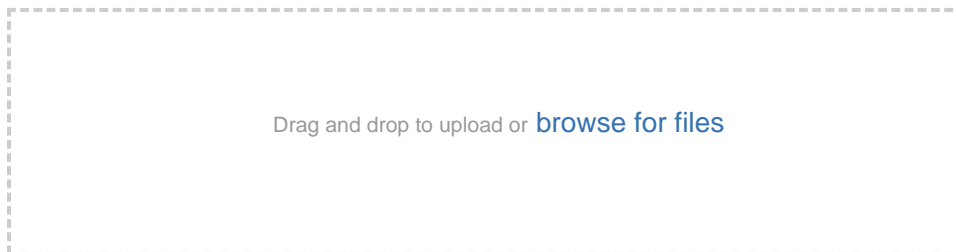
### Project - Documents

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File	Modified
>  7a.019.DU_Executive Summary.docx	Feb 23, 2018 by Sally Johnson
>  7a.019.DU_PowerPoint Presentation.pptx	Feb 23, 2018 by Sally Johnson
>  7a.019.DU_Quad Chart_2018 Spring Meeting.PPTX	Mar 15, 2018 by Sally Johnson
>  7a.019.DU_2018 Fall Meeting Poster.pptx	Nov 12, 2018 by Sally Johnson
>  7a.019.DU_Mid-Year Report.docx	Jan 14, 2019 by Sally Johnson



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### Project - Comments

	Leadership (All Sites)	
	CVDI Marketing Materials	+
	CVDI Reports & Document Library	+
	CVDI SITE (Drexel University)	+
	CVDI SITE (Stony Brook University)	+
	CVDI SITE (Tampere University)	+
	CVDI SITE (University of Louisiana at Lafayette)	+
	CVDI SITE (University of North Carolina at Charlotte)	+
	CVDI SITE (University of Virginia)	+
	IAB - Industry Advisory Board	+
	Year 6 - Funded Projects (7/1/17 - 6/30/18)	+
	Year 7 - Funded Projects (7/1/18 - 6/30/19)	+
	Year 8 - Proposed Projects	+

