



# Basal vs Luminal breast cancer LSGI results explorer

Visualize NMF gradients  
on images

Explore individual  
NMF gradients

Compare Geneset  
Enrichment between NMF  
gradients

LSGI is a tool that generates NMF gradients from spatial transcriptomic data using NMF and a sliding window to discover where the gradient is spatially detected.

We ran LSGI on 3 basal breast cancer samples and 3 luminal breast cancer samples from HTAN. For every image, 10 NMFs are generated, each representing various gene programs within the data.

This project was supported by the HTAN Data Jamboree

Learn more about this project [here](#).

Learn more LSGI from the [manuscript](#) and [GitHub](#).





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https://LSGI.mdanderson.org



NMF gradients on Images

Individual NMF gradients

Geneset Enrichment between NMF gradients

Basal

SampleID ▼

Luminal

SampleID ▼





https://LSGI.mdanderson.org



NMF gradients on Images

Individual NMF gradients

Geneset Enrichment between NMF gradients

Basal

SampleID ▼

Luminal

SampleID ▼



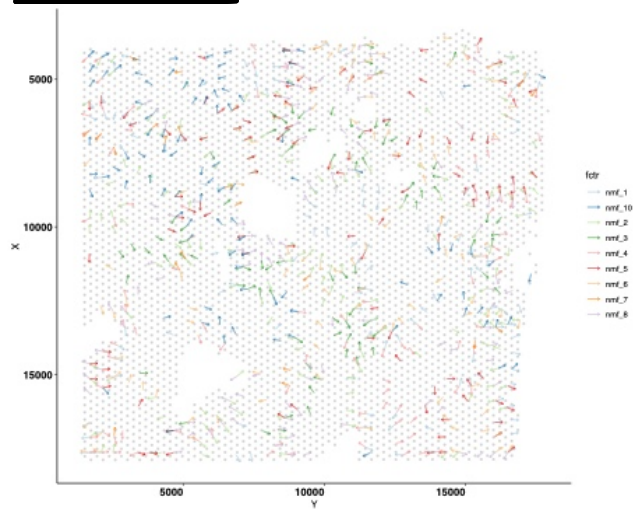
NMF gradients on Images

Individual NMF gradients

Geneset Enrichment between NMF gradients

Basal

HT206B1



Luminal

SampleID



- |   |  |
|---|--|
| <input checked="" type="checkbox"/> <a href="#">NMF_1</a> | <input checked="" type="checkbox"/> <a href="#">NMF_6</a>  |
| <input checked="" type="checkbox"/> <a href="#">NMF_2</a> | <input checked="" type="checkbox"/> <a href="#">NMF_7</a>  |
| <input checked="" type="checkbox"/> <a href="#">NMF_3</a> | <input checked="" type="checkbox"/> <a href="#">NMF_8</a>  |
| <input checked="" type="checkbox"/> <a href="#">NMF_4</a> | <input checked="" type="checkbox"/> <a href="#">NMF_9</a>  |
| <input checked="" type="checkbox"/> <a href="#">NMF_5</a> | <input checked="" type="checkbox"/> <a href="#">NMF_10</a> |

Select All

Select None

<https://LSGI.mdanderson.org>

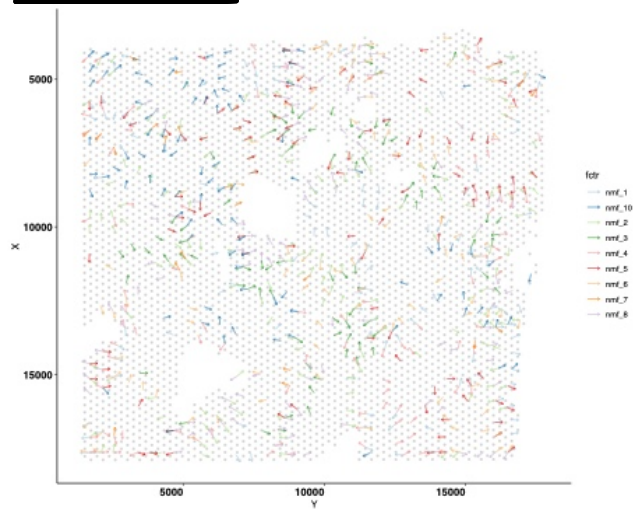
NMF gradients on Images

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Basal

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SampleID



- |   |   |
|---|---|
| <input checked="" type="checkbox"/> <a href="#">NMF_1</a> | <input type="checkbox"/> <a href="#">NMF_6</a>  |
| <input checked="" type="checkbox"/> <a href="#">NMF_2</a> | <input type="checkbox"/> <a href="#">NMF_7</a>  |
| <input type="checkbox"/> <a href="#">NMF_3</a>            | <input type="checkbox"/> <a href="#">NMF_8</a>  |
| <input type="checkbox"/> <a href="#">NMF_4</a>            | <input type="checkbox"/> <a href="#">NMF_9</a>  |
| <input type="checkbox"/> <a href="#">NMF_5</a>            | <input type="checkbox"/> <a href="#">NMF_10</a> |

Select All

Select None

<https://LSGI.mdanderson.org>

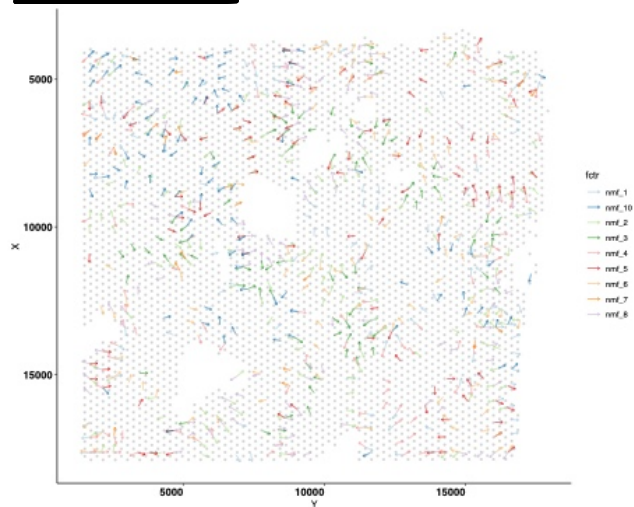
NMF gradients on Images

Individual NMF gradients

Geneset Enrichment between NMF gradients

Basal

HT206B1



Luminal

SampleID



- |   |   |
|---|---|
| <input checked="" type="checkbox"/> <a href="#">NMF_1</a> | <input type="checkbox"/> <a href="#">NMF_6</a>  |
| <input checked="" type="checkbox"/> <a href="#">NMF_2</a> | <input type="checkbox"/> <a href="#">NMF_7</a>  |
| <input type="checkbox"/> <a href="#">NMF_3</a>            | <input type="checkbox"/> <a href="#">NMF_8</a>  |
| <input type="checkbox"/> <a href="#">NMF_4</a>            | <input type="checkbox"/> <a href="#">NMF_9</a>  |
| <input type="checkbox"/> <a href="#">NMF_5</a>            | <input type="checkbox"/> <a href="#">NMF_10</a> |

Select All

Select None



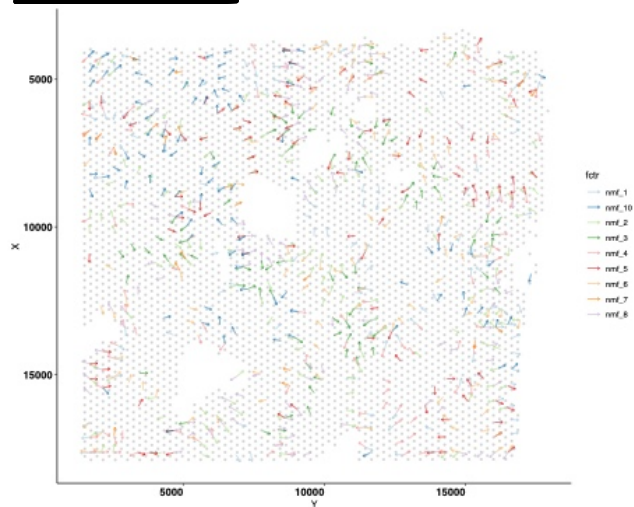
NMF gradients on Images

Individual NMF gradients

Geneset Enrichment between NMF gradients

## Basal

HT206B1 ▼



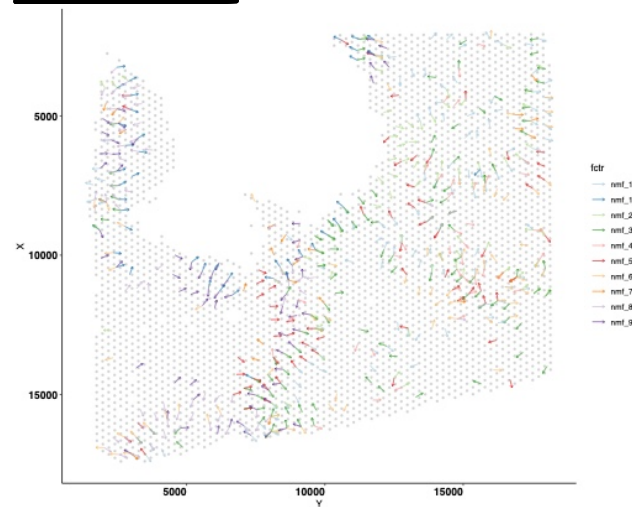
- |   |   |
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| <input type="checkbox"/> <a href="#">NMF_4</a>            | <input type="checkbox"/> <a href="#">NMF_9</a>  |
| <input type="checkbox"/> <a href="#">NMF_5</a>            | <input type="checkbox"/> <a href="#">NMF_10</a> |

Select All

Select None

## Luminal

HT305B1 ▼



- |   |  |
|---|--|
| <input checked="" type="checkbox"/> <a href="#">NMF_1</a> | <input checked="" type="checkbox"/> <a href="#">NMF_6</a>  |
| <input checked="" type="checkbox"/> <a href="#">NMF_2</a> | <input checked="" type="checkbox"/> <a href="#">NMF_7</a>  |
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Select All

Select None





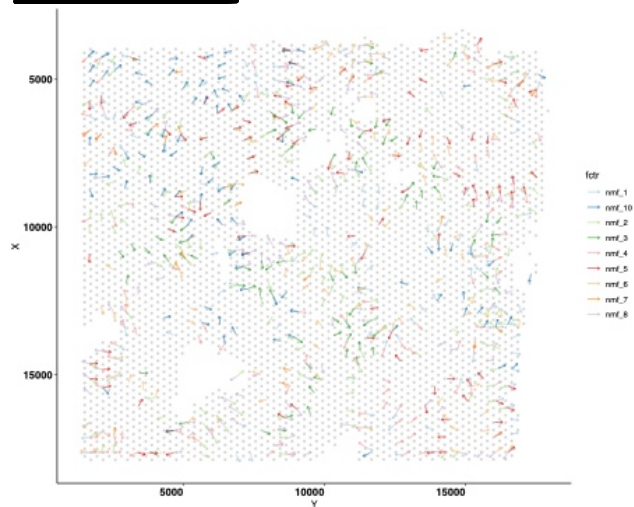
NMF gradients on Images

Individual NMF gradients

Geneset Enrichment between NMF gradients

## Basal

HT206B1 ▼



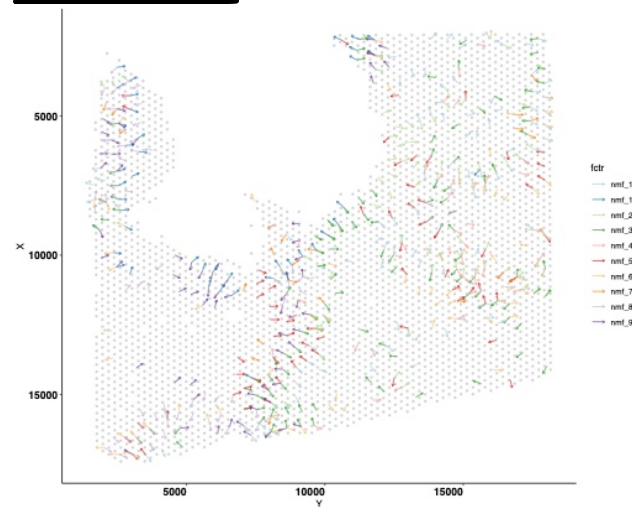
- |   |   |
|---|---|
| <input checked="" type="checkbox"/> <a href="#">NMF_1</a> | <input type="checkbox"/> <a href="#">NMF_6</a>  |
| <input checked="" type="checkbox"/> <a href="#">NMF_2</a> | <input type="checkbox"/> <a href="#">NMF_7</a>  |
| <input type="checkbox"/> <a href="#">NMF_3</a>            | <input type="checkbox"/> <a href="#">NMF_8</a>  |
| <input type="checkbox"/> <a href="#">NMF_4</a>            | <input type="checkbox"/> <a href="#">NMF_9</a>  |
| <input type="checkbox"/> <a href="#">NMF_5</a>            | <input type="checkbox"/> <a href="#">NMF_10</a> |

Select All

Select None

## Luminal

HT305B1 ▼



- |   |  |
|---|--|
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| <input checked="" type="checkbox"/> <a href="#">NMF_2</a> | <input checked="" type="checkbox"/> <a href="#">NMF_7</a>  |
| <input checked="" type="checkbox"/> <a href="#">NMF_3</a> | <input checked="" type="checkbox"/> <a href="#">NMF_8</a>  |
| <input checked="" type="checkbox"/> <a href="#">NMF_4</a> | <input checked="" type="checkbox"/> <a href="#">NMF_9</a>  |
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Select All

Select None



NMF gradients on Images

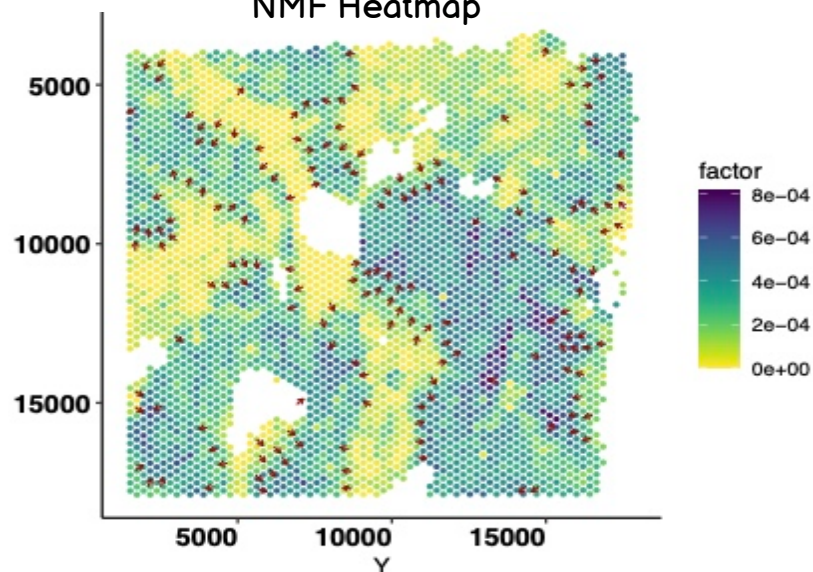
Individual NMF gradients

Geneset Enrichment between NMF gradients

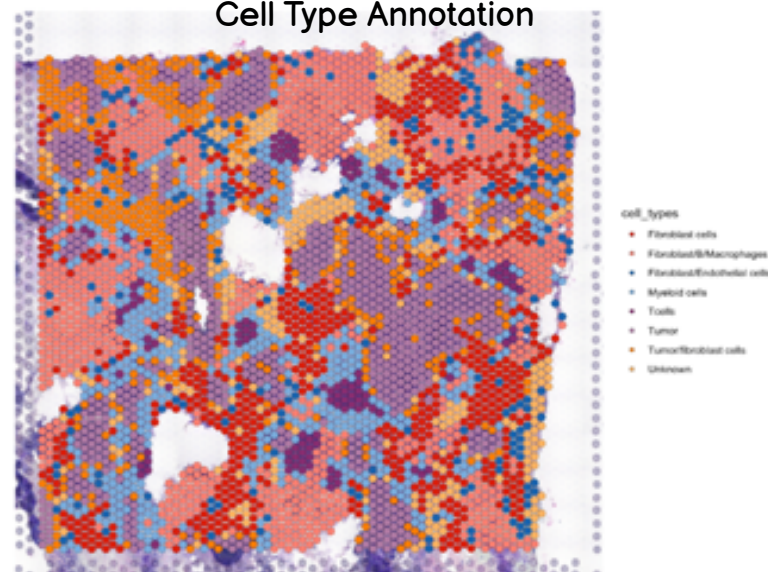
Sample HT206B1

NMF NMF\_1

NMF Heatmap



Cell Type Annotation



## Genes

C17orf51  
MOGAT2  
NUTM2B  
PRKCB  
PRRC2B  
C1orf132  
SENP2

## Enriched genesets

**\*respiratory electron transport chain (GO:0022904)**  
**\*mitochondrial ATP synthesis coupled electron transport (GO:0043143)**  
nervous system development (GO:0007399)  
glycolytic process through glucose-6-phosphate (GO:0061620)  
canonical glycolysis (GO:0061621)  
glucose catabolic process to pyruvate (GO:0061718)  
regulation of cholesterol biosynthetic process (GO:0045540)  
regulation of macroautophagy (GO:0016241)  
hexose biosynthetic process (GO:0019319)  
regulation of steroid biosynthetic process (GO:0050810)



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NMF gradients on Images

Individual NMF gradients

Geneset Enrichment between NMF gradients

Sample

NMF

X axis

HT206B1



NMF\_1



Y axis

HT305B1



Select NMF





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NMF gradients on Images

Individual NMF gradients

Geneset Enrichment between NMF gradients

Sample

NMF

X axis

HT206B1 ▼

NMF\_1 ▼

Y axis

HT305B1 ▼

Select NMF ▼



NMF gradients on Images

Individual NMF gradients

Geneset Enrichment between NMF gradients

Sample

NMF

X axis

HT206B1 ▼

Y axis

HT305B1 ▼

NMF\_1 ▼

NMF\_2 ▼

