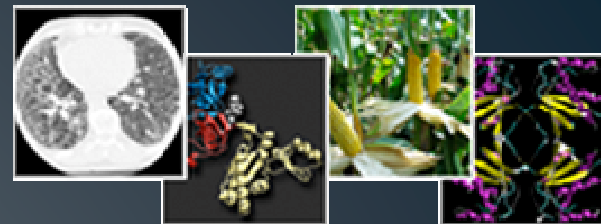




University of Missouri

**Informatics Institute**



# Retrieving Haystacks of Biomedical and Geospatial Information for Needle- Size Intelligence

Chi-Ren Shyu, Ph.D.

Director of Informatics Institute

Paul K. and Diane Shumaker Endowed Professor

[shyuc@missouri.edu](mailto:shyuc@missouri.edu)

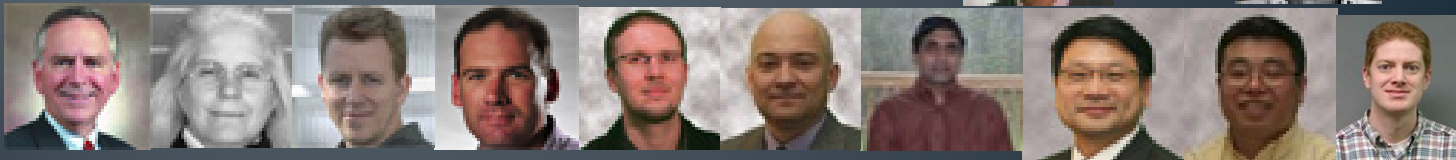
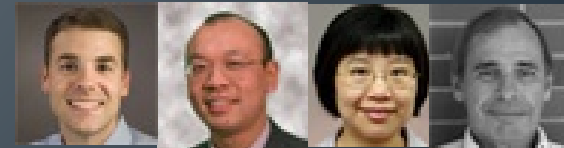
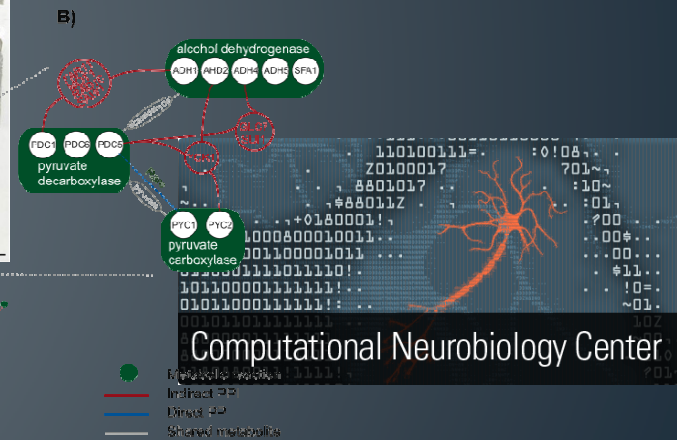
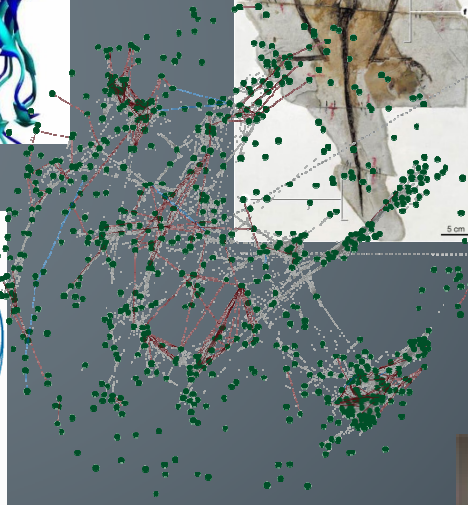
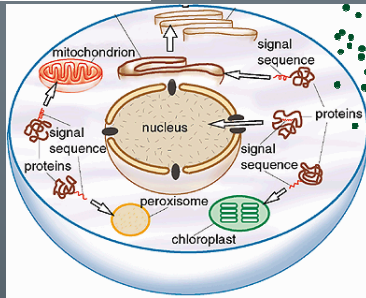
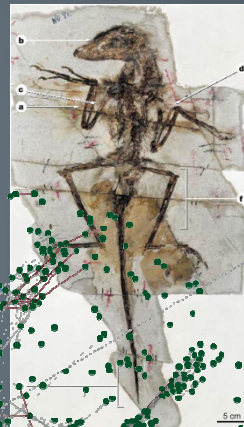
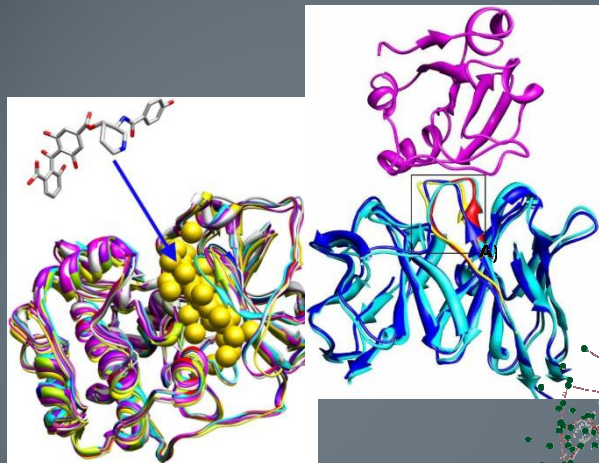
April 12, 2011

MU Informatics Institute (MUII) is a hub for biomedical, health, and geospatial informatics research, education, and services



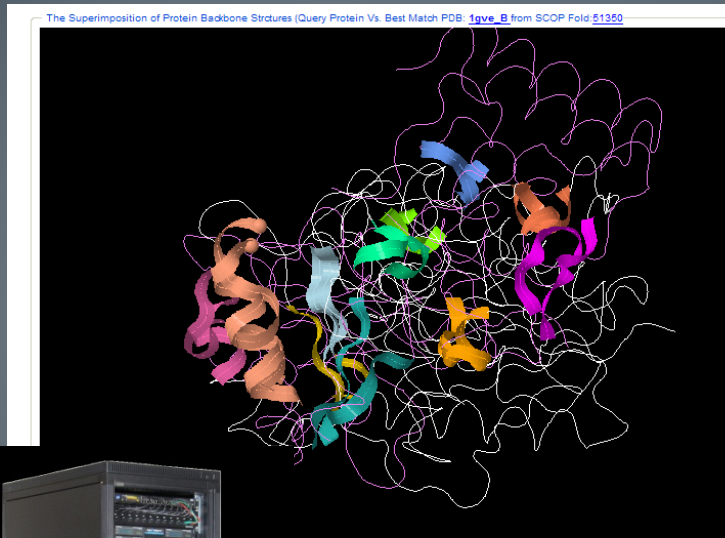
# Bioinformatics

Plant biology, structure biology, cancer research, neurobiology, animal sciences, energy, translational bioinformatics, etc.



# ProteinDBS – “Google for Protein Structures”

The first real-time protein structure retrieval engine in the world.



The Superimposition of Protein Backbone Structures (Query Protein 1O7J CHAIN A Vs. PDB ID: 1J5R CHAIN B)

spinning  Query Protein (Orange)  Result Protein (Lightblue) [Clear Labels](#)  
Display Theme: 1) Default (Ball and Stick) 2) Cartoon 3) Strands 4) Dots

View Top 100 Search Results

Ranking: 1	Ranking: 2
PDB 1O7J Chain A	PDB 1O7J Chain B
Ranking: 3	Ranking: 4
PDB 1J5R Chain B	PDB 1J5L Chain B
Ranking: 5	Ranking: 6
PDB 1O7J Chain C	PDB 1HQQ Chain A
Ranking: 7	Ranking: 8
PDB 1J5R Chain A	PDB 1J5L Chain A

[New Search](#) [Next](#)

Sequence Alignment: Query Chain 1O7J CHAIN A V.S Result Chain: 1J5R CHAIN B

[PDB](#) [PDB](#) [PDB](#)

```
4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
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LPNIVILATGGTIAAGSAATGTTGGYKAGALGVDTLINAVPEVKK
4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
LANVKGEGQFSNMASENMTGDDVVLKLSQRVNE LLARDDVDGVI TH
LANVKGEGQFSNMASENMTGDDVVLKLSQRVNE LLARDDVDGVI TH
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93
94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138
GTD TVEESAYFLHLTVKSDKPVVFAAMRPATAISADGPMNLL EA
GTD TVEESAYFLHLTVKSDKPVVFAAMRPATAISADGPMNLL EA
94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138
142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183
AGDKQSRGRGVVINDRIGSARYITKTRASTLDTFRANE EG
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322 323 324 325 326 327
E F H T Y
E Y F H T Y
322 323 324 325 326 327
```

Chain Length:	305
Chain Length:	324
ngth:	324
gsrom):	0.25



Result Protein (Violet)  
2) Cartoon 3) Strands 4) Dots



# VPhenoDBS – “Google for Plant Images”



Query Results - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://vphenodbs.net.missouri.edu/output2.php?out

Most Visited Getting Started Latest Headlines

### Query Results

#### Query By Semantic

Available Terms:

- Dead
- Irregular Lesions
- Small Lesions
- Medium Size Lesions
- Large Lesions
- Yellow Lesions
- Green Lesions

Query Semantics:

- Elliptical Lesions
- Brown Lesions

Number of Results: 50

Search

#### Distribution of les Mutants in Results

Mutation	Number
les1	2
les2	2
les5	2
les6	2
les7	2
les8	2
les18	2
les19	24
les21	2

#### Result Image Data:

Relevance: 49.8474%

Row: 706

Plant #: 4 Date Taken: 08/12/2007

Leaf #: 13 Location: Southfarm, Columbia, MO

Leaf Section: Stem Mutation: les19

View other plants in this row | View all images of this plant

#### Relevance of Semantic Terms

Semantic Term	Relevance
Brown Lesion	1.0
Irregular Lesion	0.8
Large Lesion	0.6
Medium Size Lesion	0.4

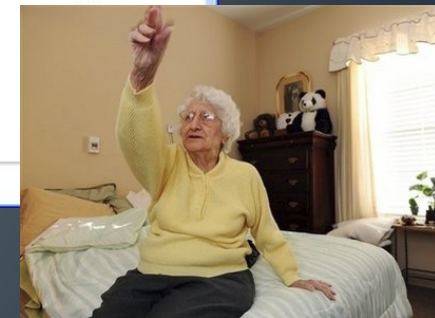
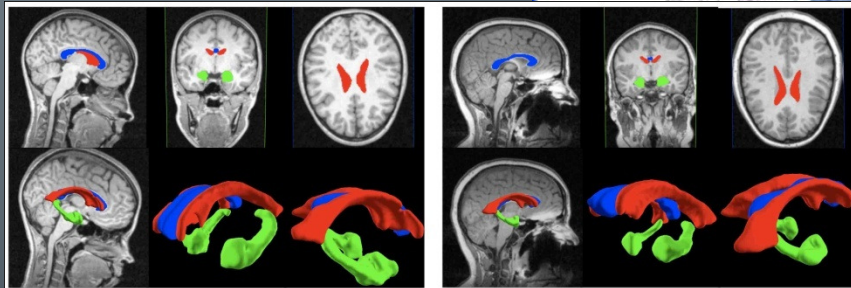
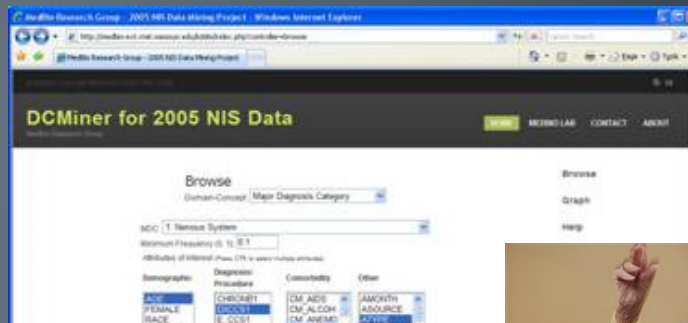
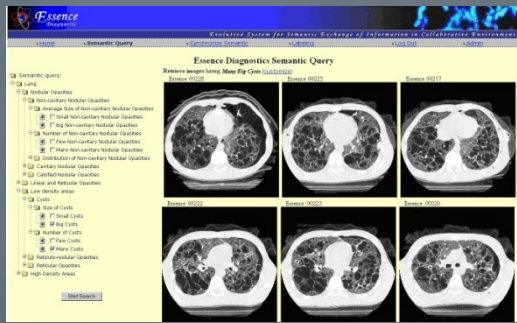
<< Prev | 1 - 10 | Next >> Popul List

Image Index	Relevance
1	49.8474%
2	49.4115%
3	48.3451%
4	47.7888%
5	47.7547%
6	47.5575%
7	47.2796%

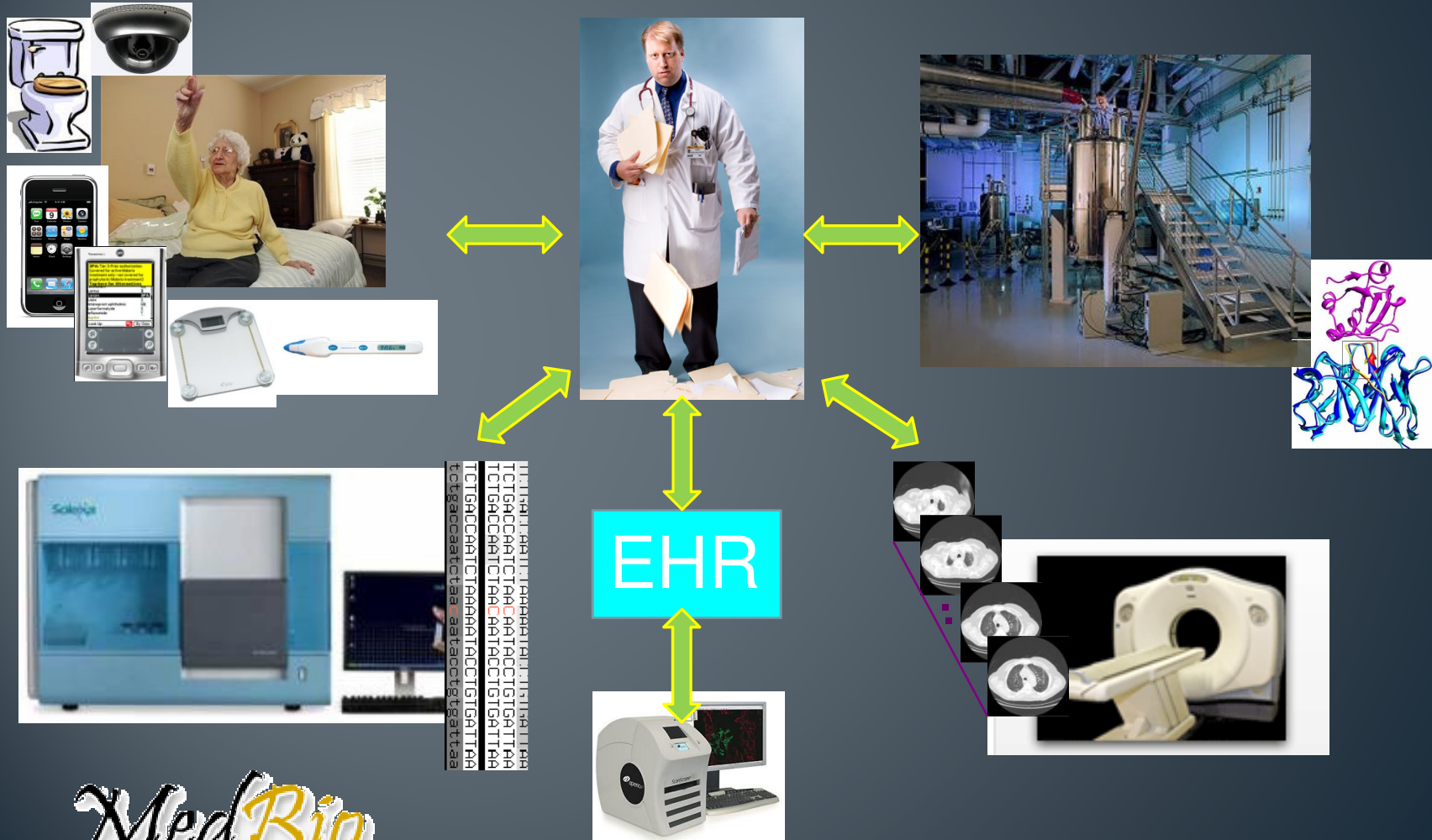
Done

# Medical/Health Informatics

EMR/EHR, Imaging Informatics, Healthcare Quality, Texting Mining, Human Computer Interaction, Nursing Informatics, Elder Care, Autism, etc.



# Informatics Approach to get Ready for Personalized Medicine



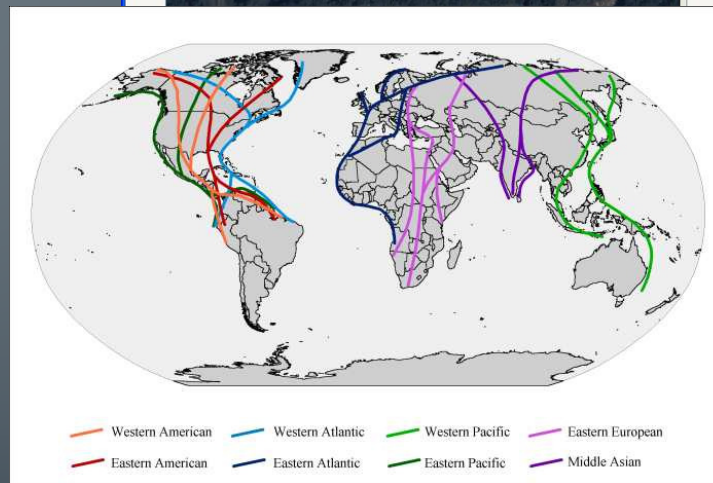
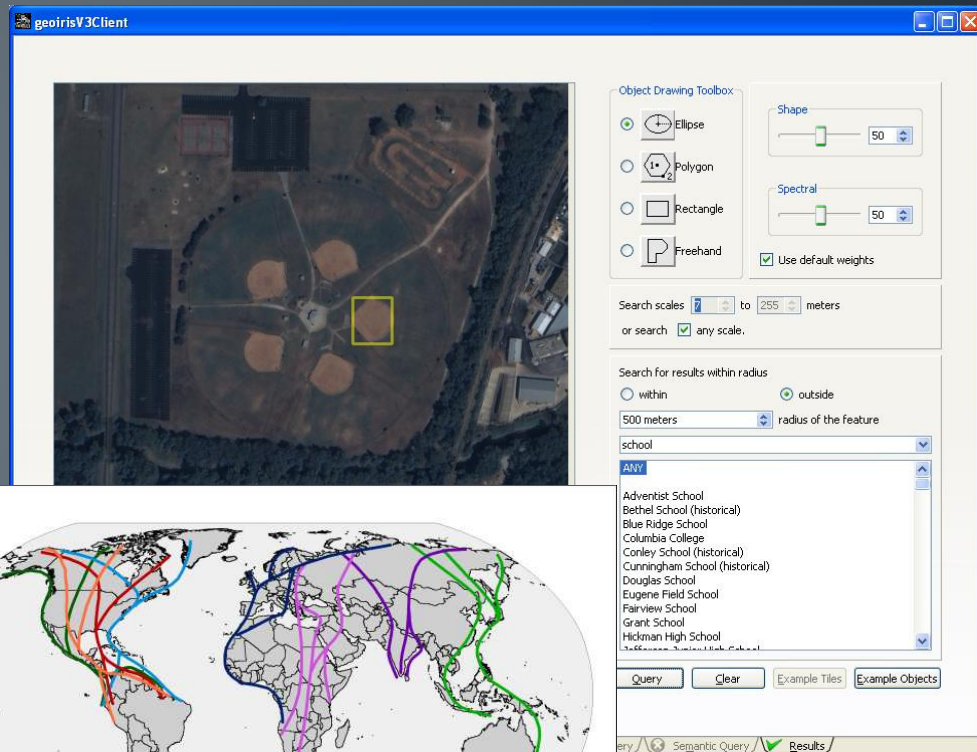
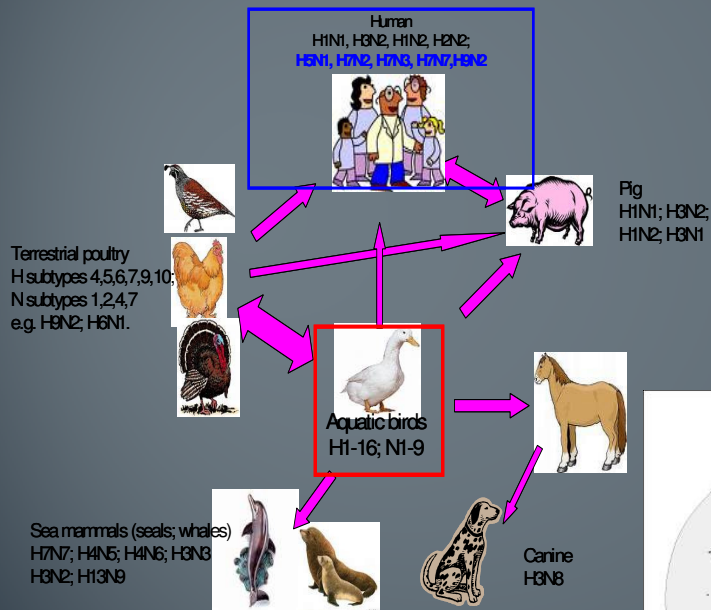
MedBio



Medical and Biological Digital Library Research Lab

# Geospatial Informatics

Epidemiology, Intelligence community, agriculture applications, crime analysis, environmental studies, etc.







start 00:00:00 stop 00:00:00

Reset

x scale y scale

spot radius spot opacity

Image  Trace  
 Voronoi  Fixations  
 Invert  Attention  Thermal