

Miriah Meyer

School of Computing

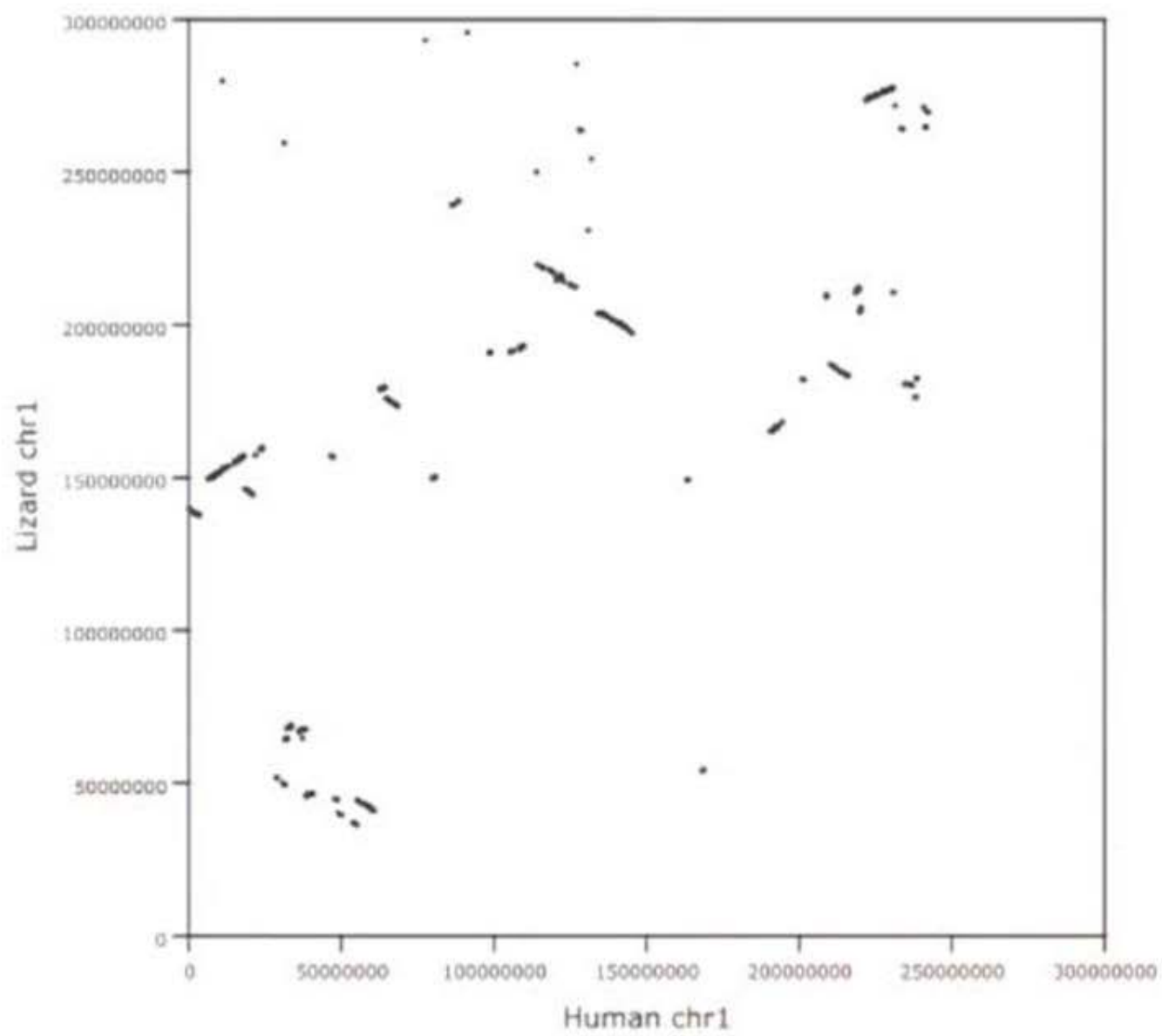
SCI Institute

University of Utah

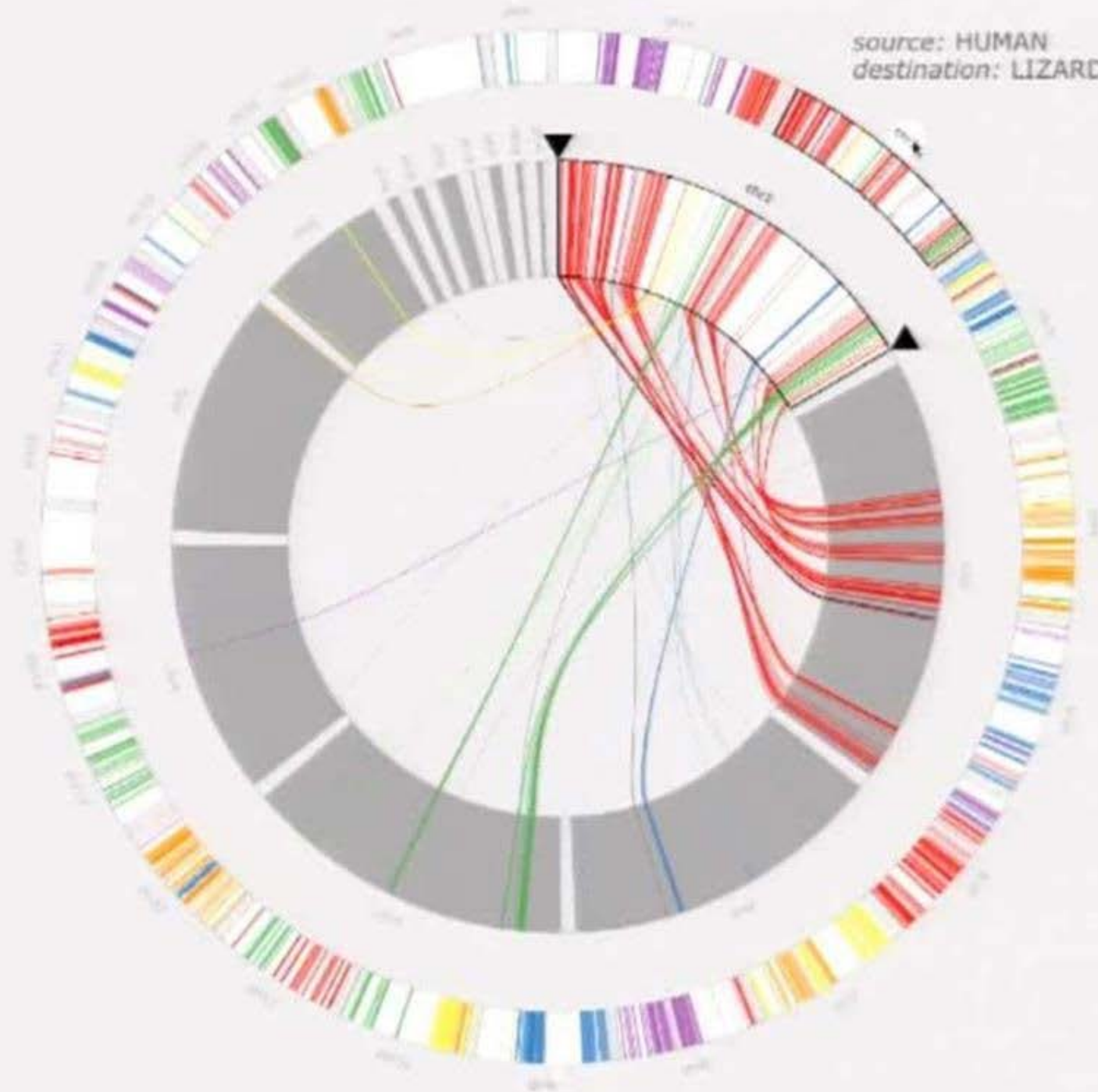


MANFRED
GRABHERR

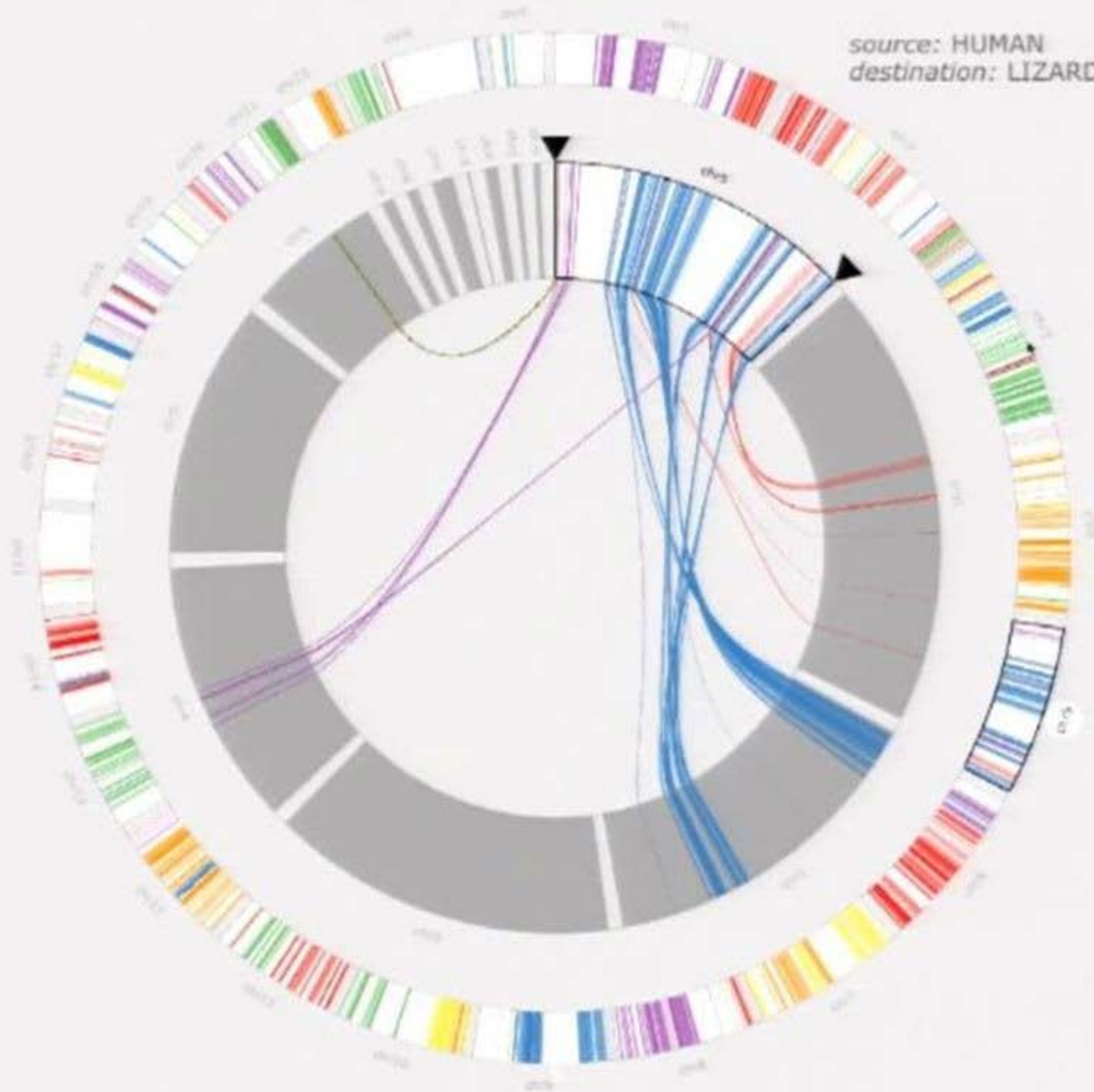




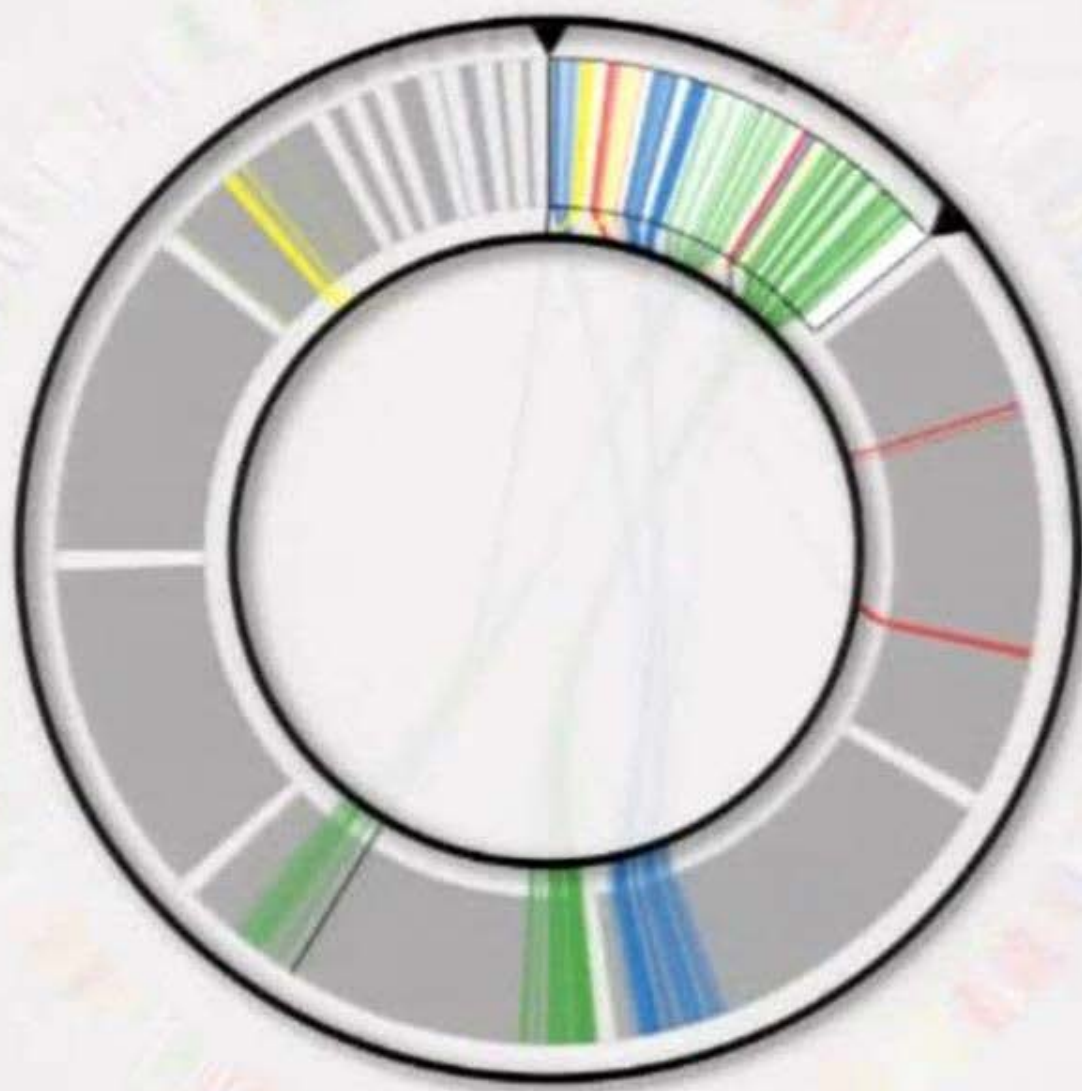
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destination: LIZARD



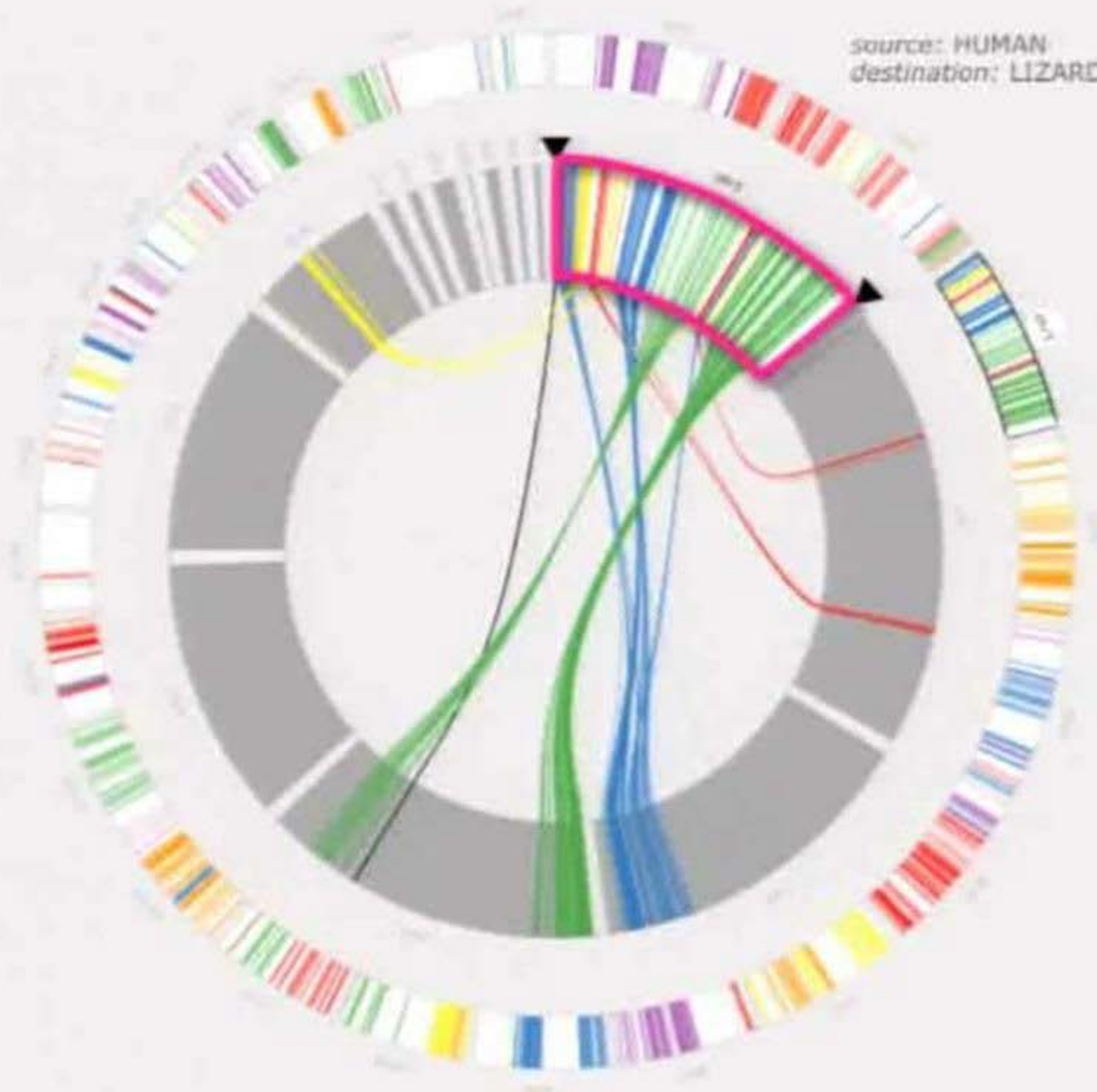
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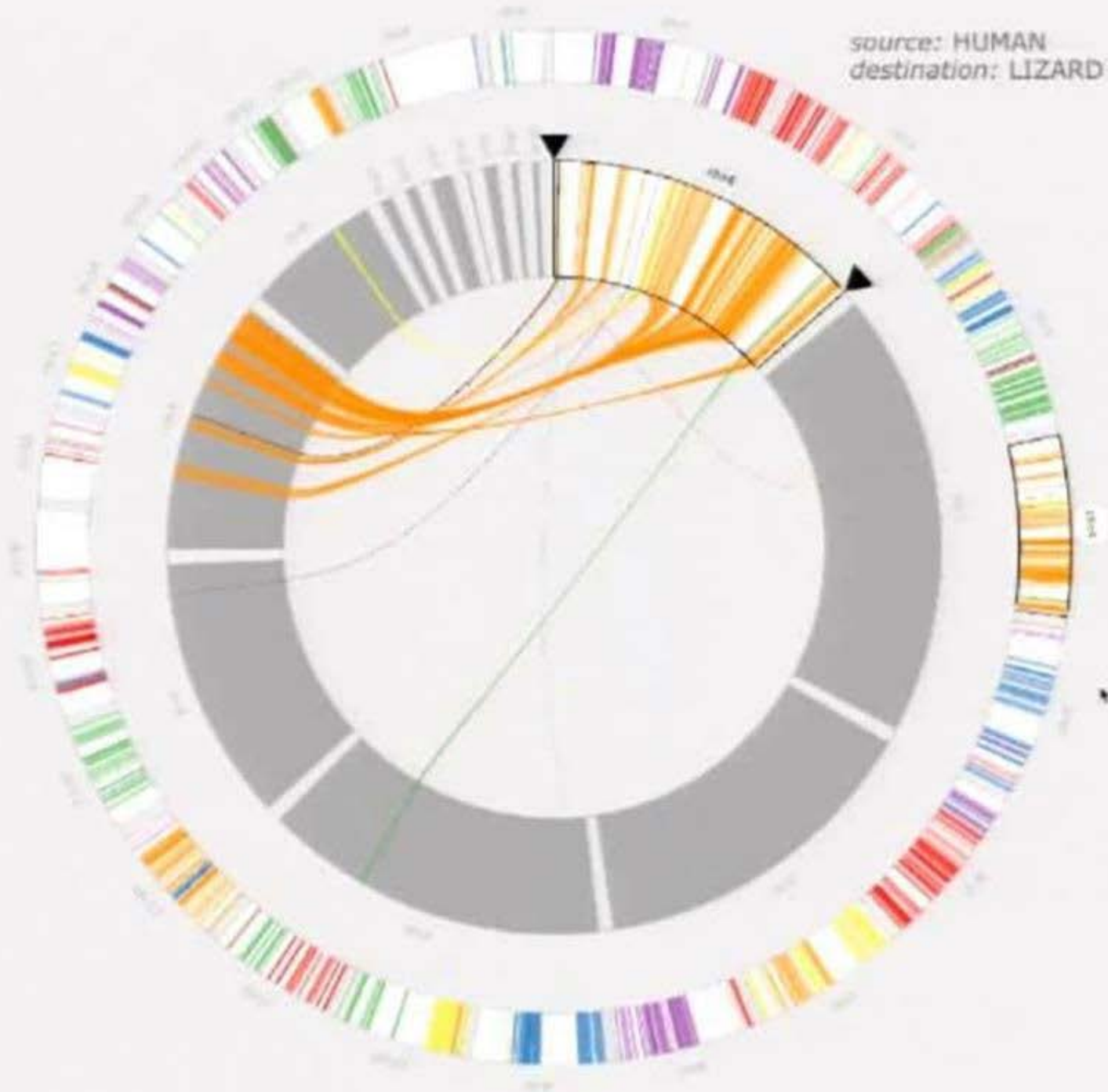
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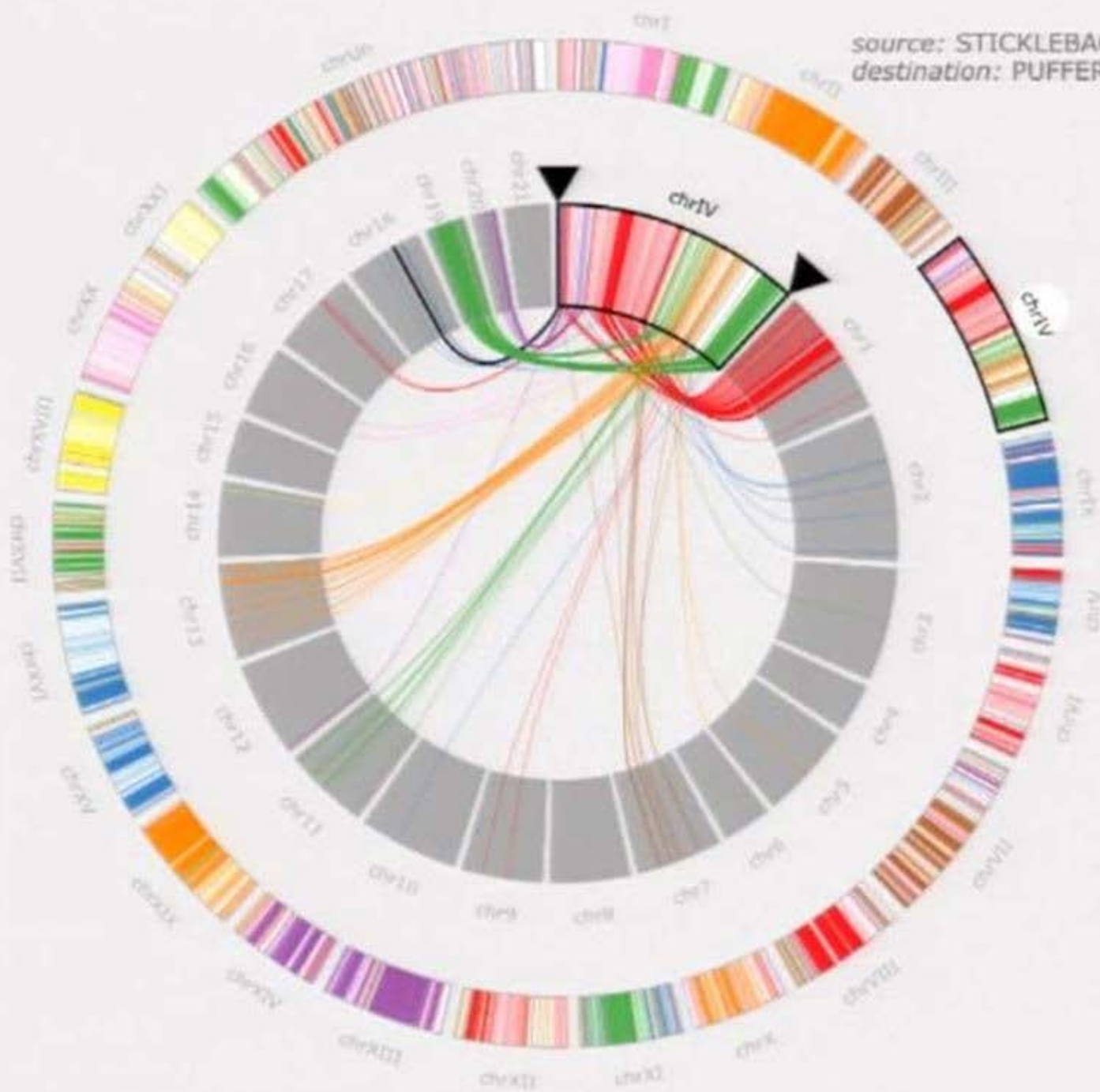
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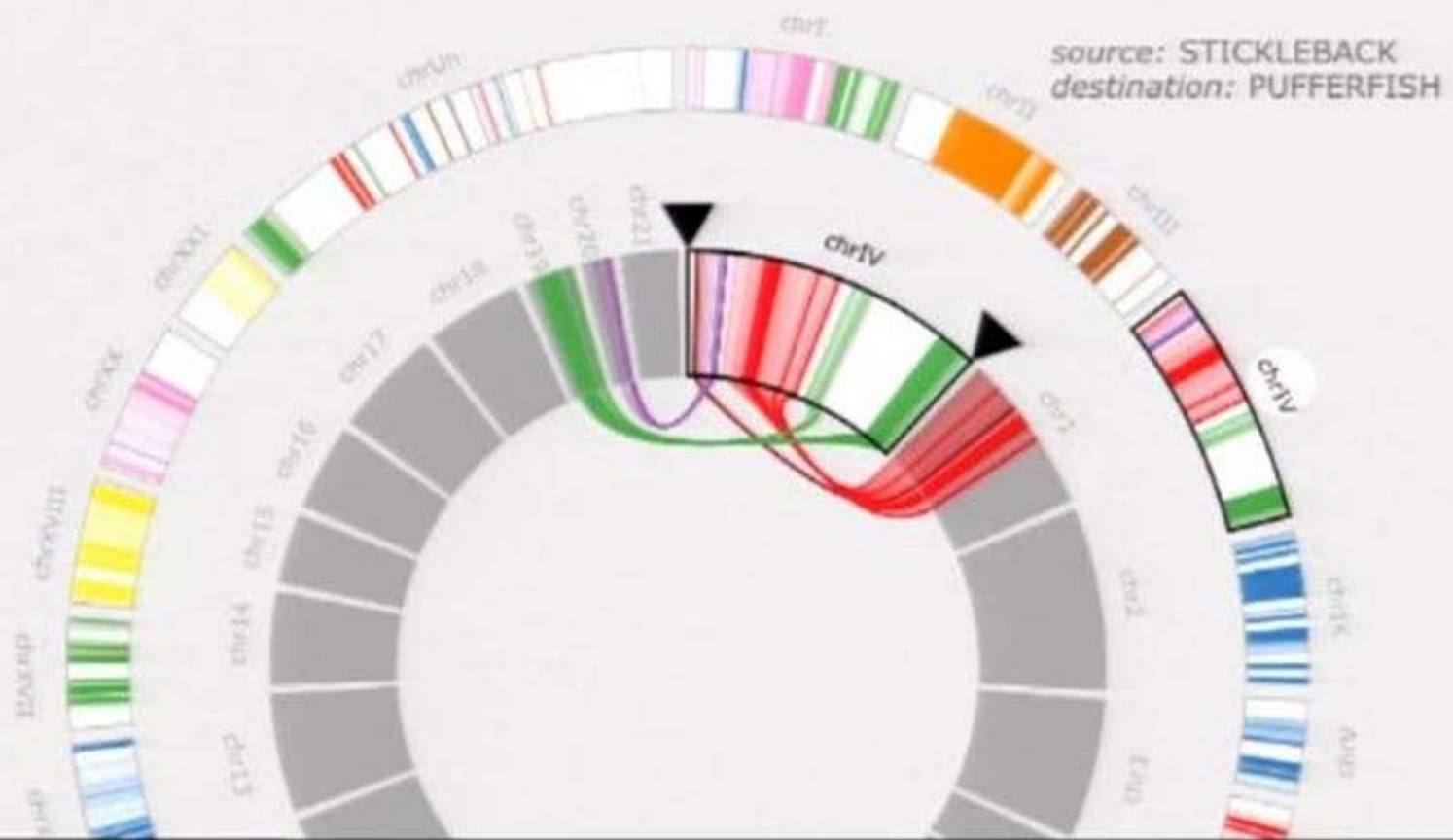


source: HUMAN
destination: LIZARD



source: STICKLEBACK
destination: PUFFERFISH



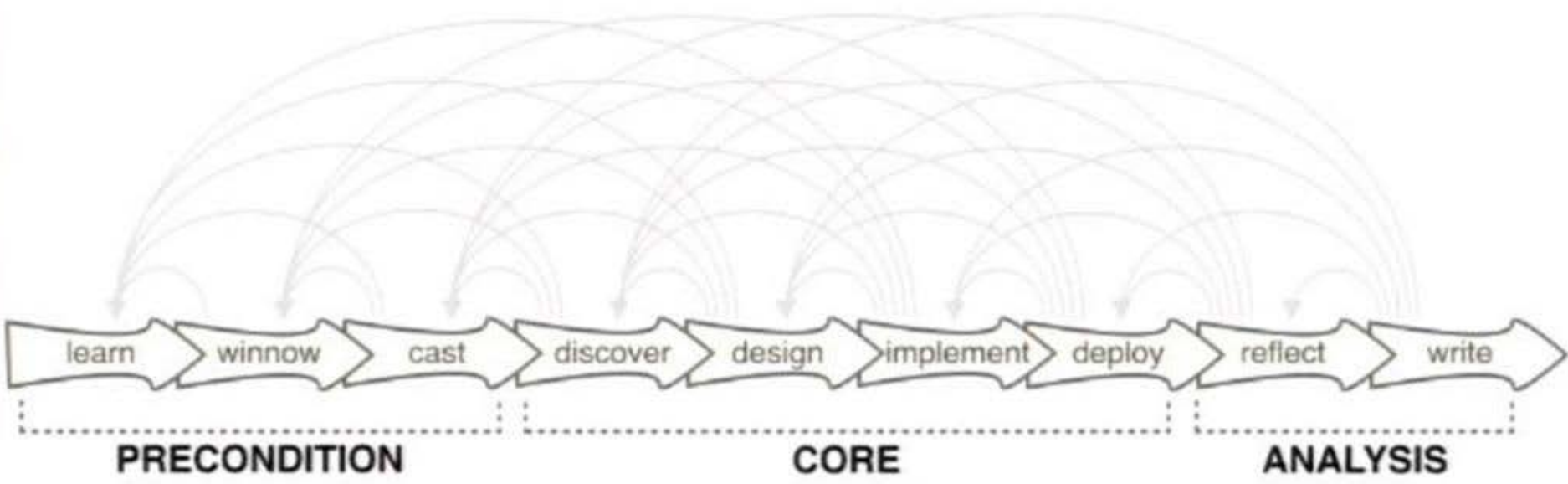


"Honestly ... I don't think I would ever have gotten here."



design study

- a project
- analyze a real-world problem
- design a visualization system
- validate the design
- reflect about lessons learned



ANGELA DEPACE



process

- two year collaboration
- two early prototype systems
- feedback from six biologists
 - informal interviews, emails*
 - one day a week in biology lab*
- tool deployed
 - currently used several times a week*

gene expression

gene expression

-how much a gene is on or off

-single, quantitative value

biologists measure it ...

... for multiple time points.



gene expression

- how much a gene is on or off
- single, quantitative value

biologists measure it ...

- ... for multiple time points.
- ... for multiple genes.

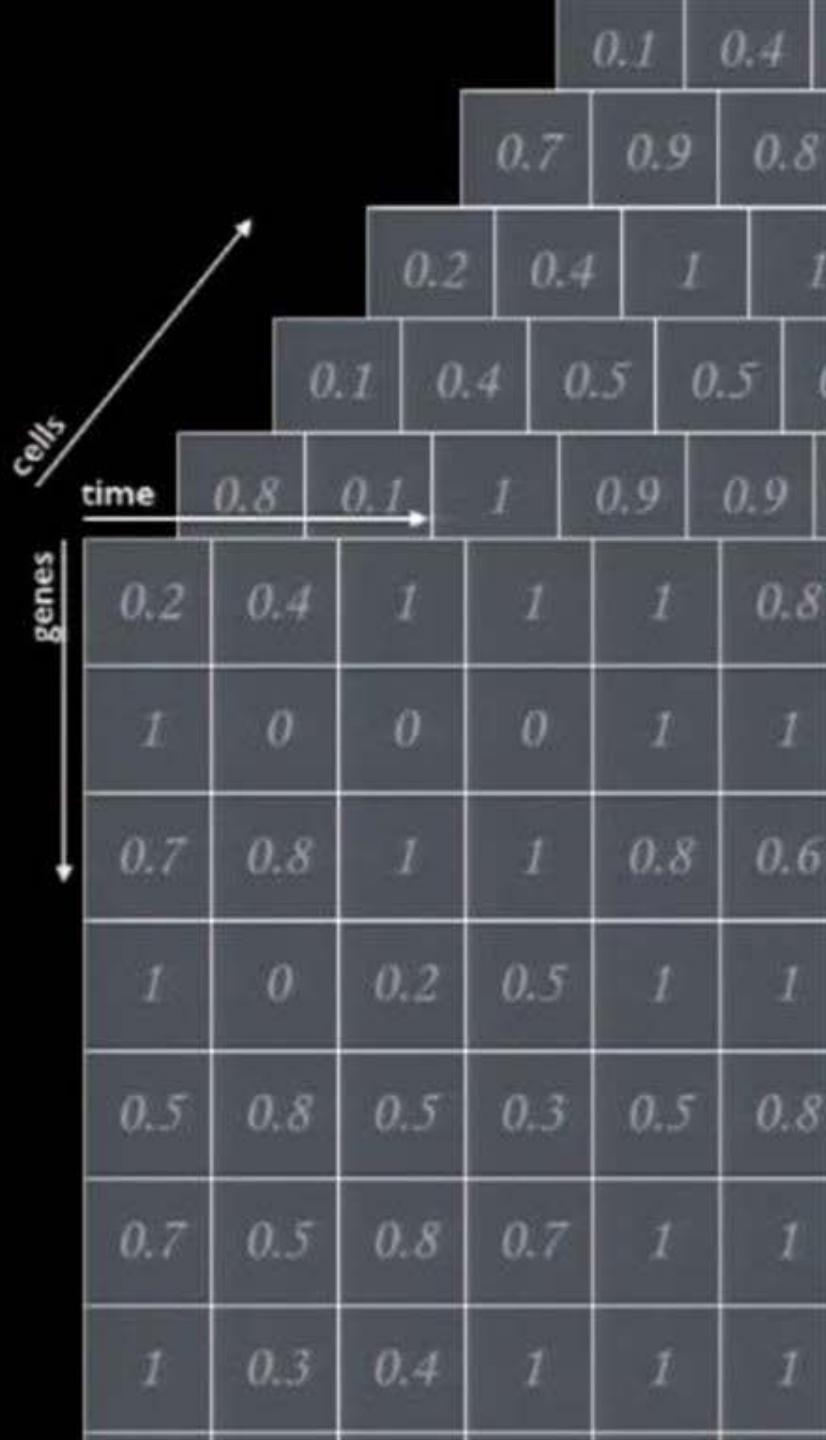
	time					
genes	0.2	0.4	1	1	1	0.8
	1	0	0	0	1	1
	0.7	0.8	1	1	0.8	0.6
	1	0	0.2	0.5	1	1
	0.5	0.8	0.5	0.3	0.5	0.8
	0.7	0.5	0.8	0.7	1	1
	1	0.3	0.4	1	1	1

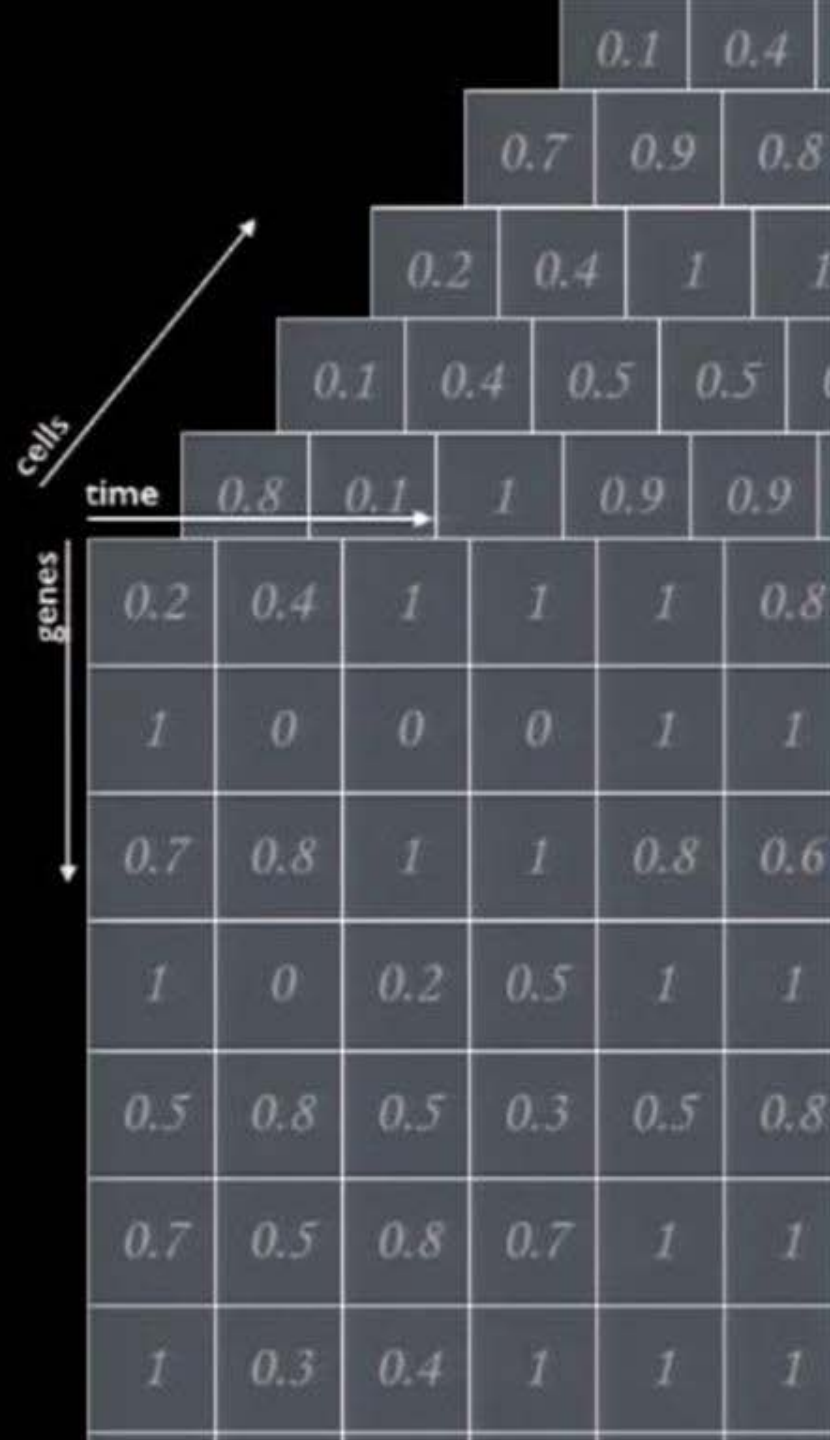
gene expression

- how much a gene is on or off
- single, quantitative value

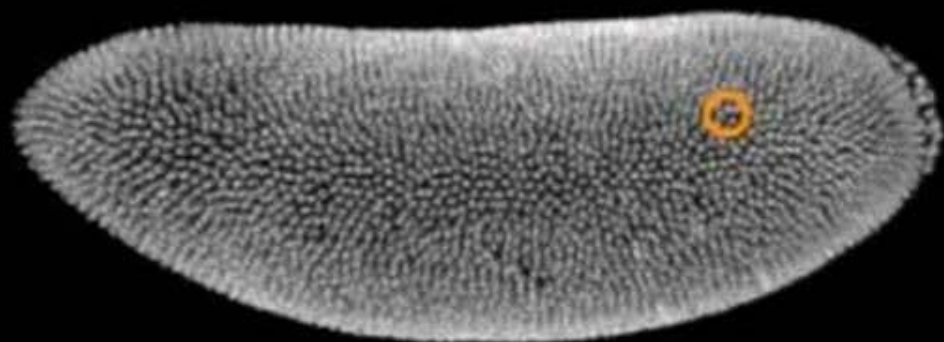
biologists measure it ...

- ... for multiple time points.
- ... for multiple genes.
- ... in many cells.

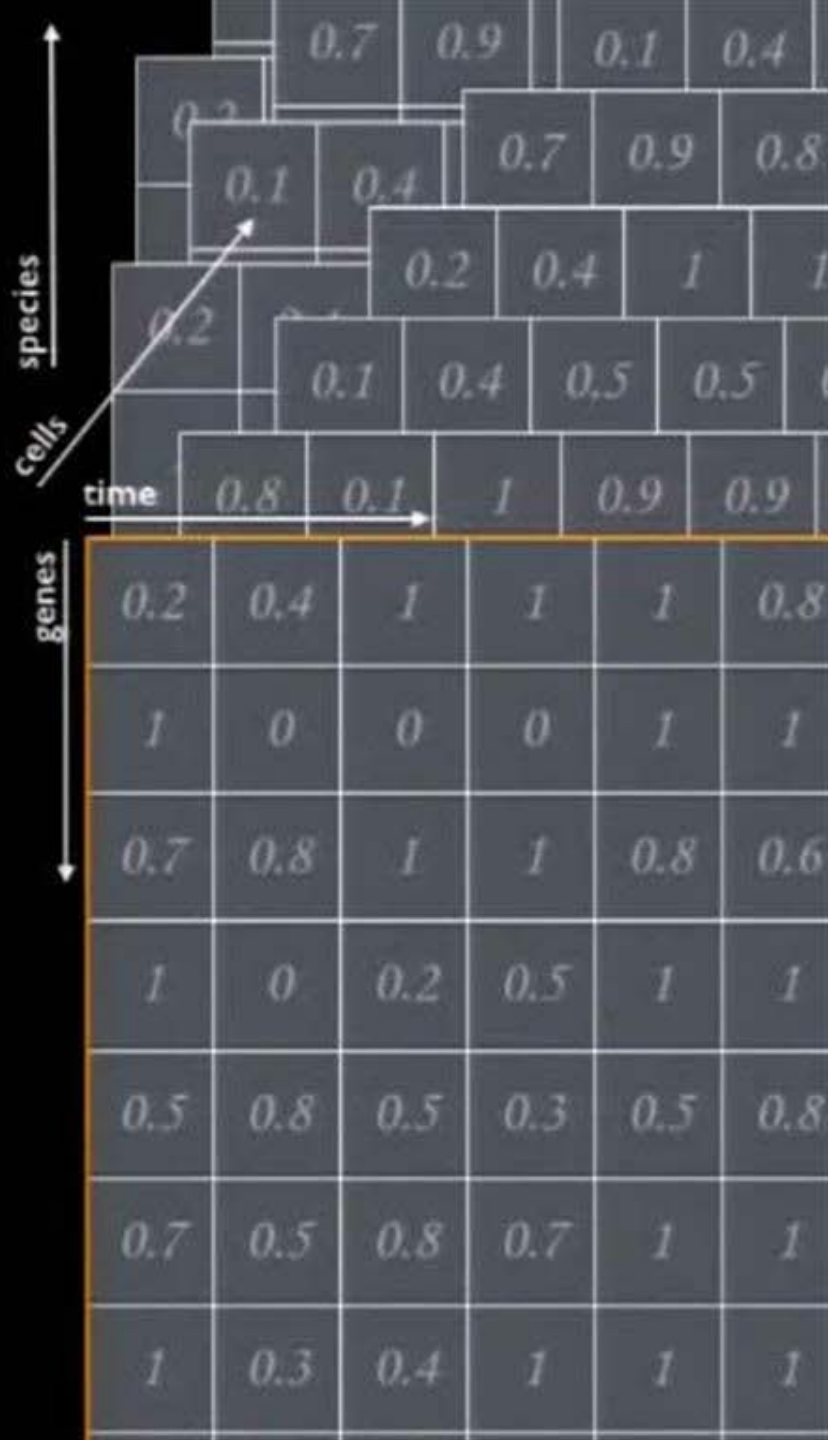




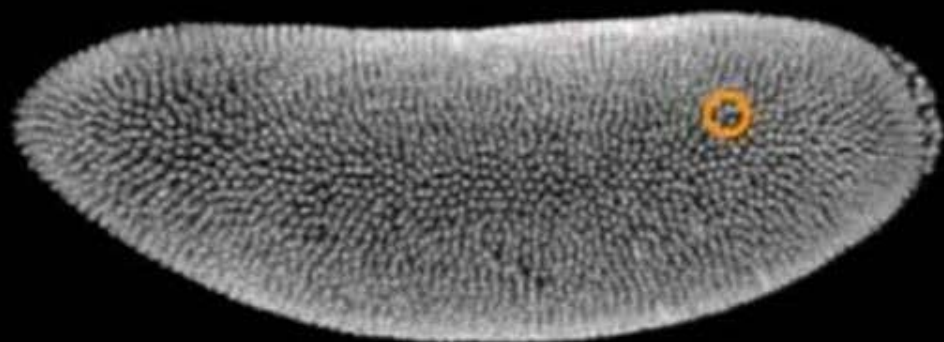
measurements taken for every cell in a single fruit fly embryo.



correlate gene expression with spatial location.

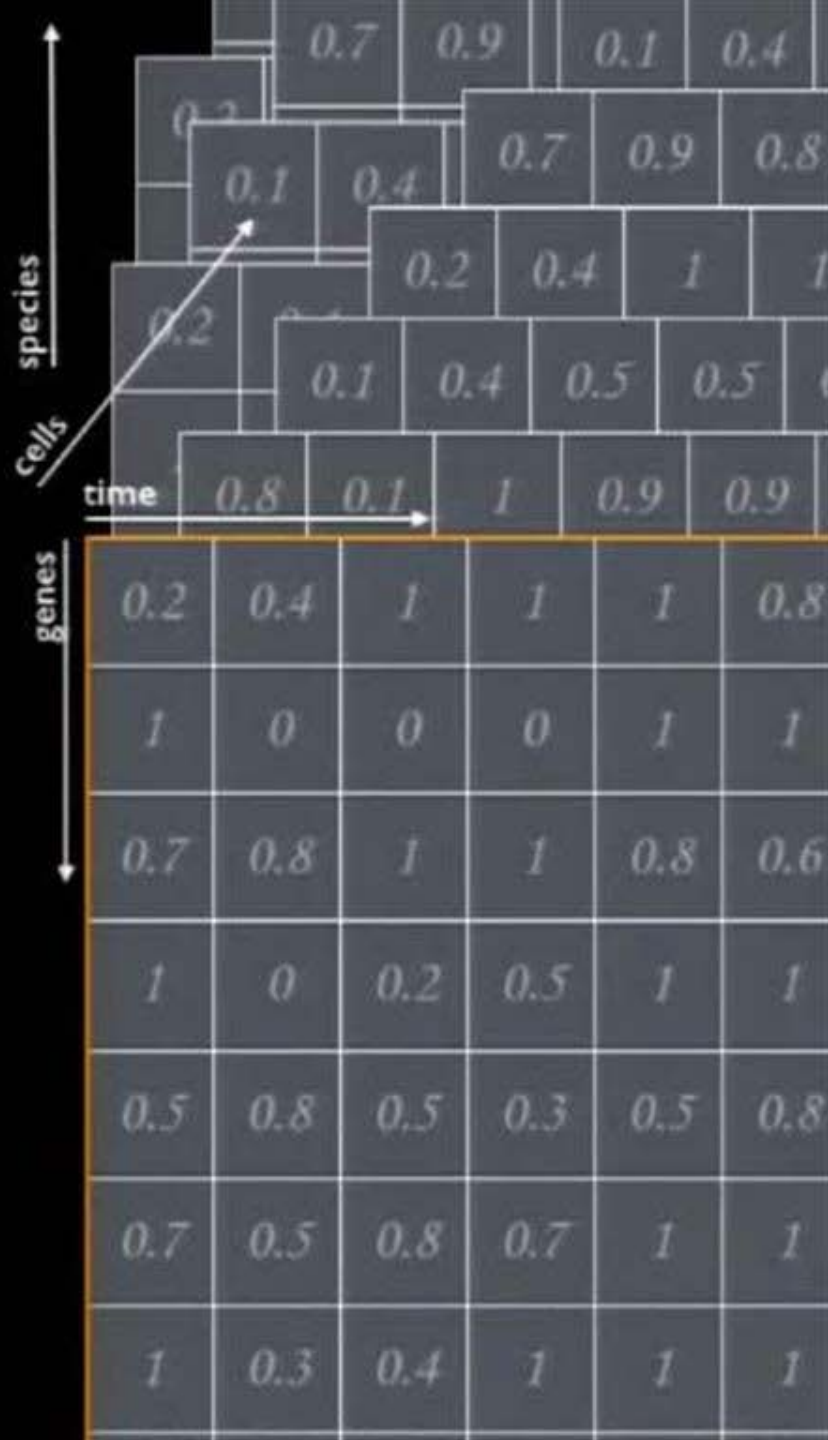


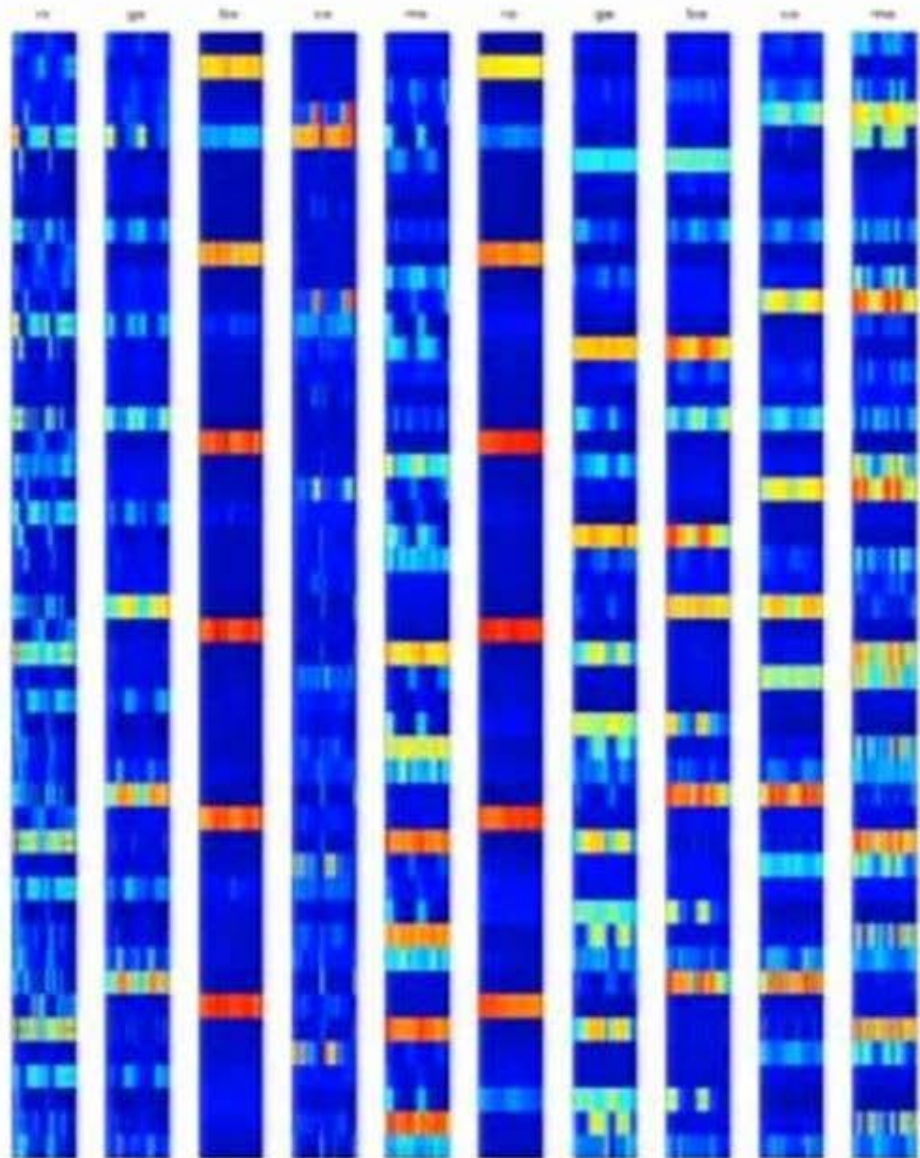
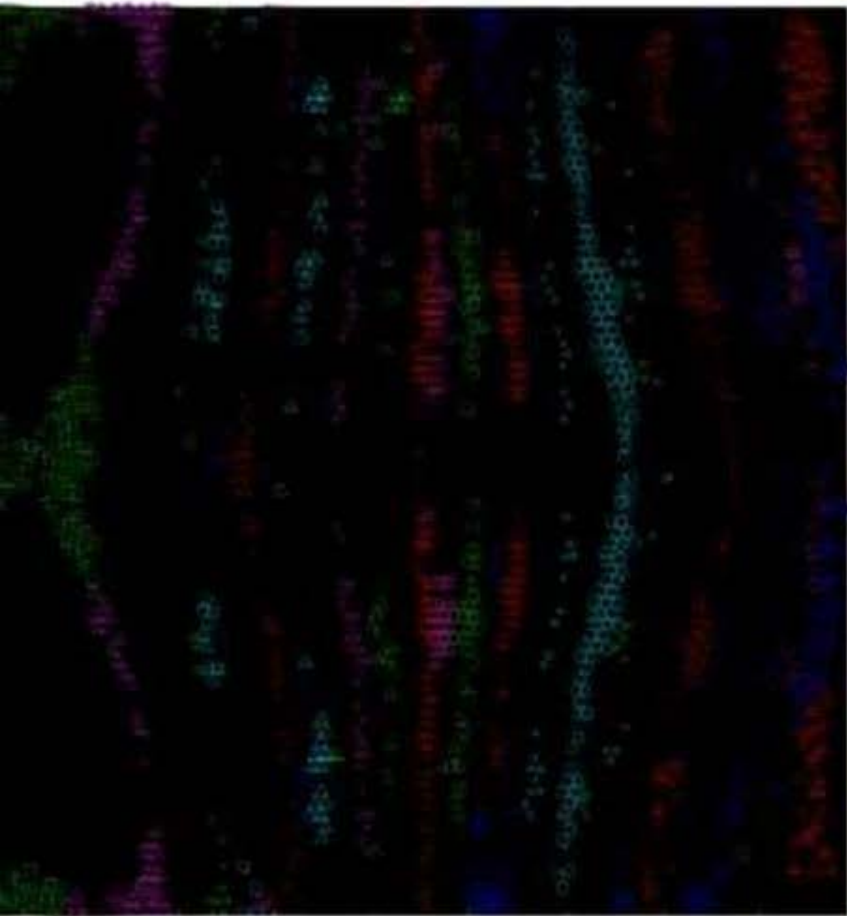
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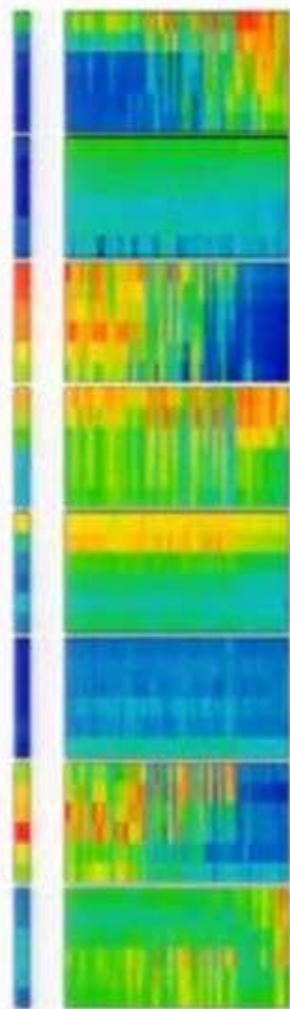
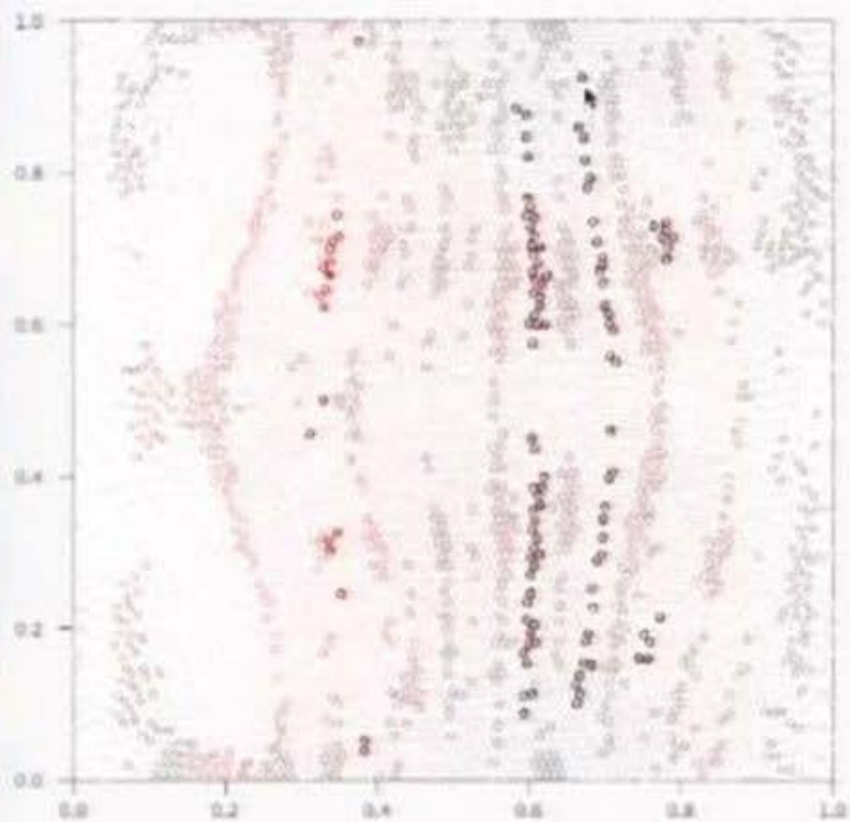
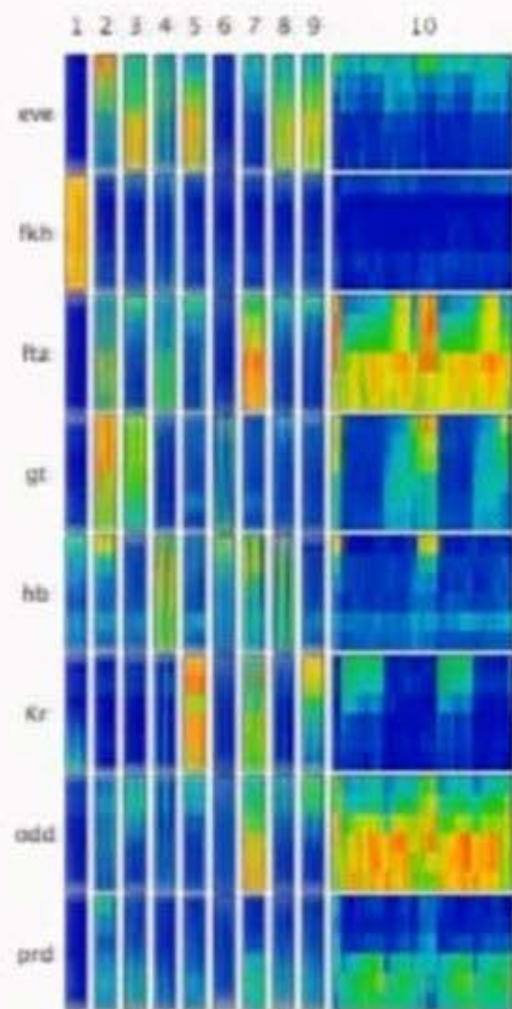


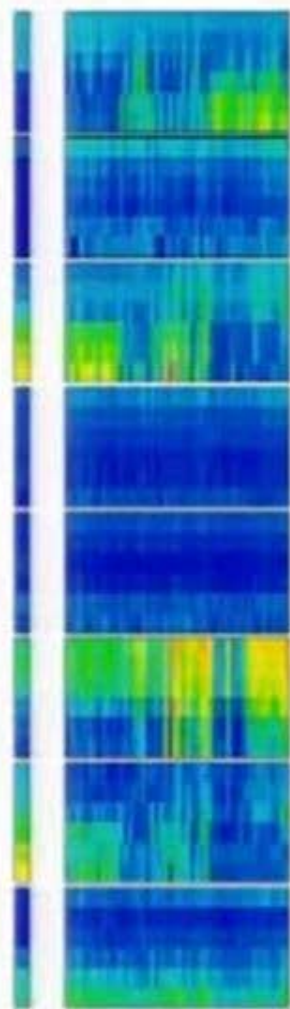
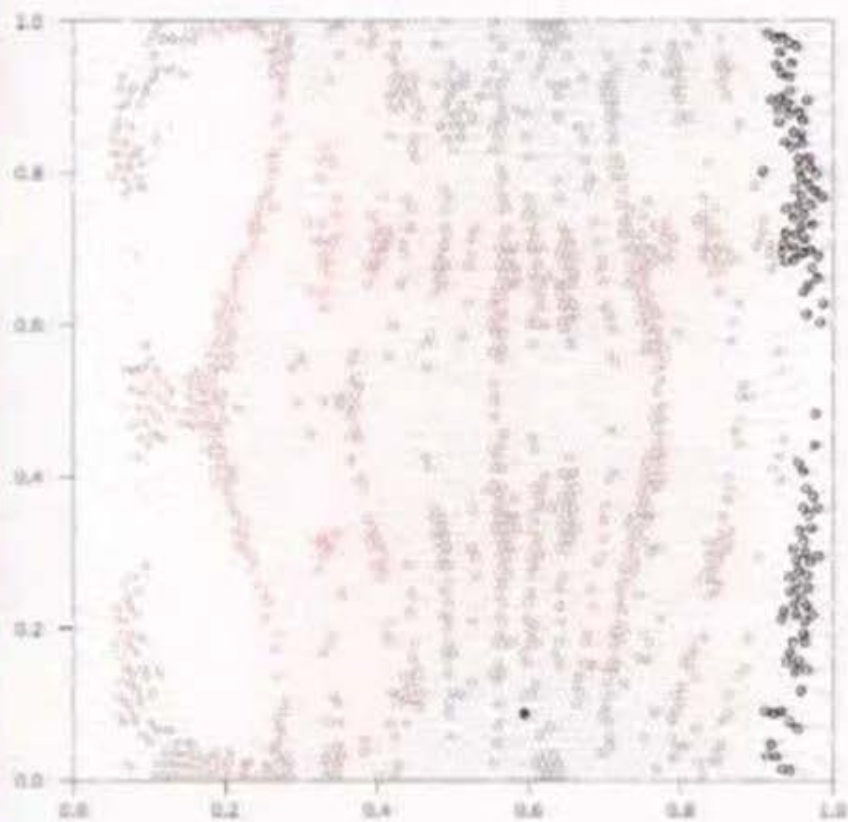
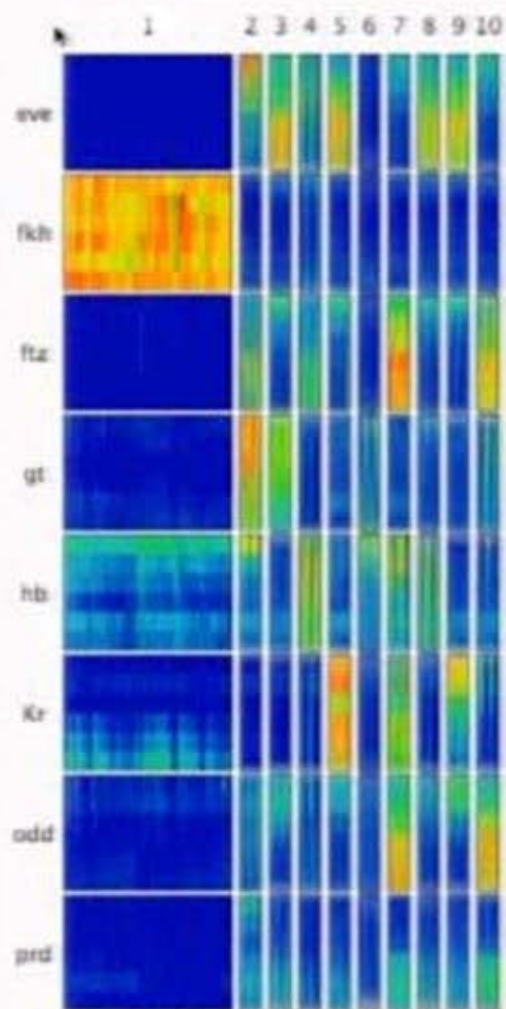
correlate gene expression with spatial location.

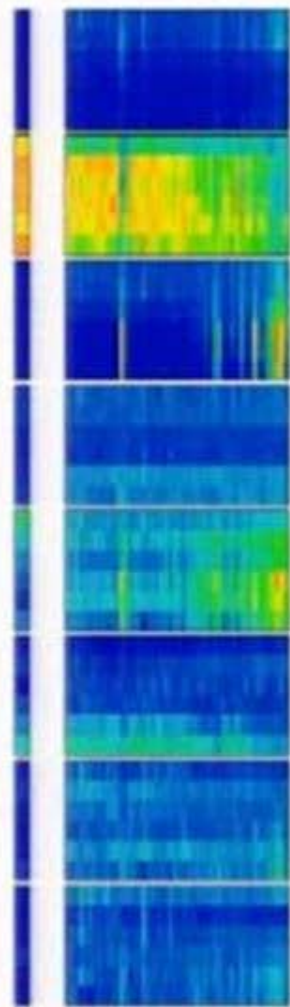
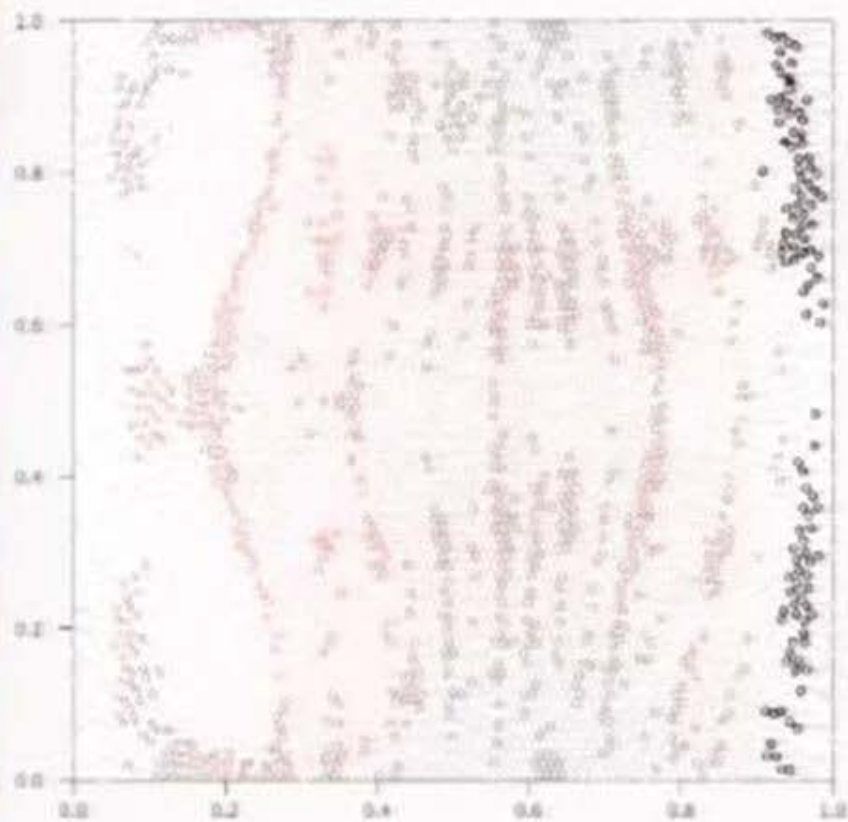
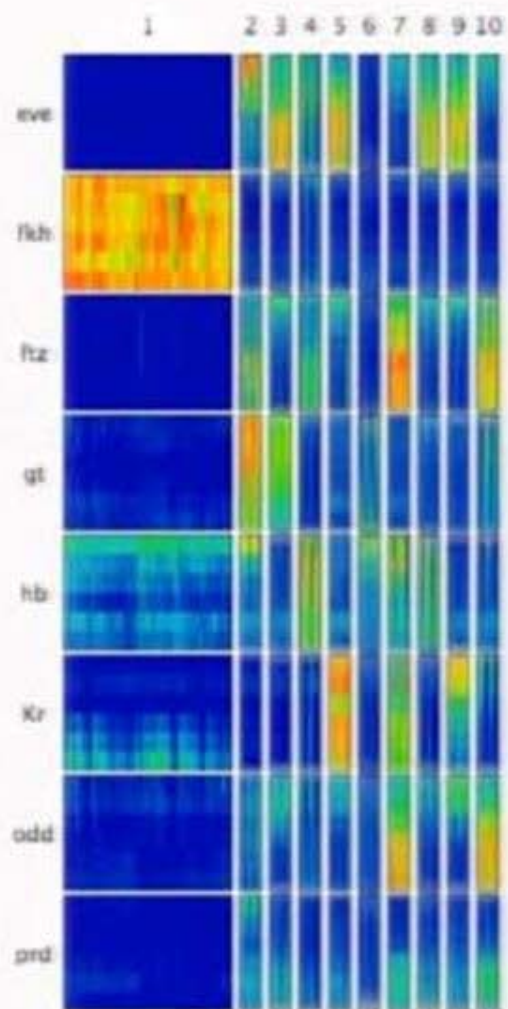
what's different between the species?

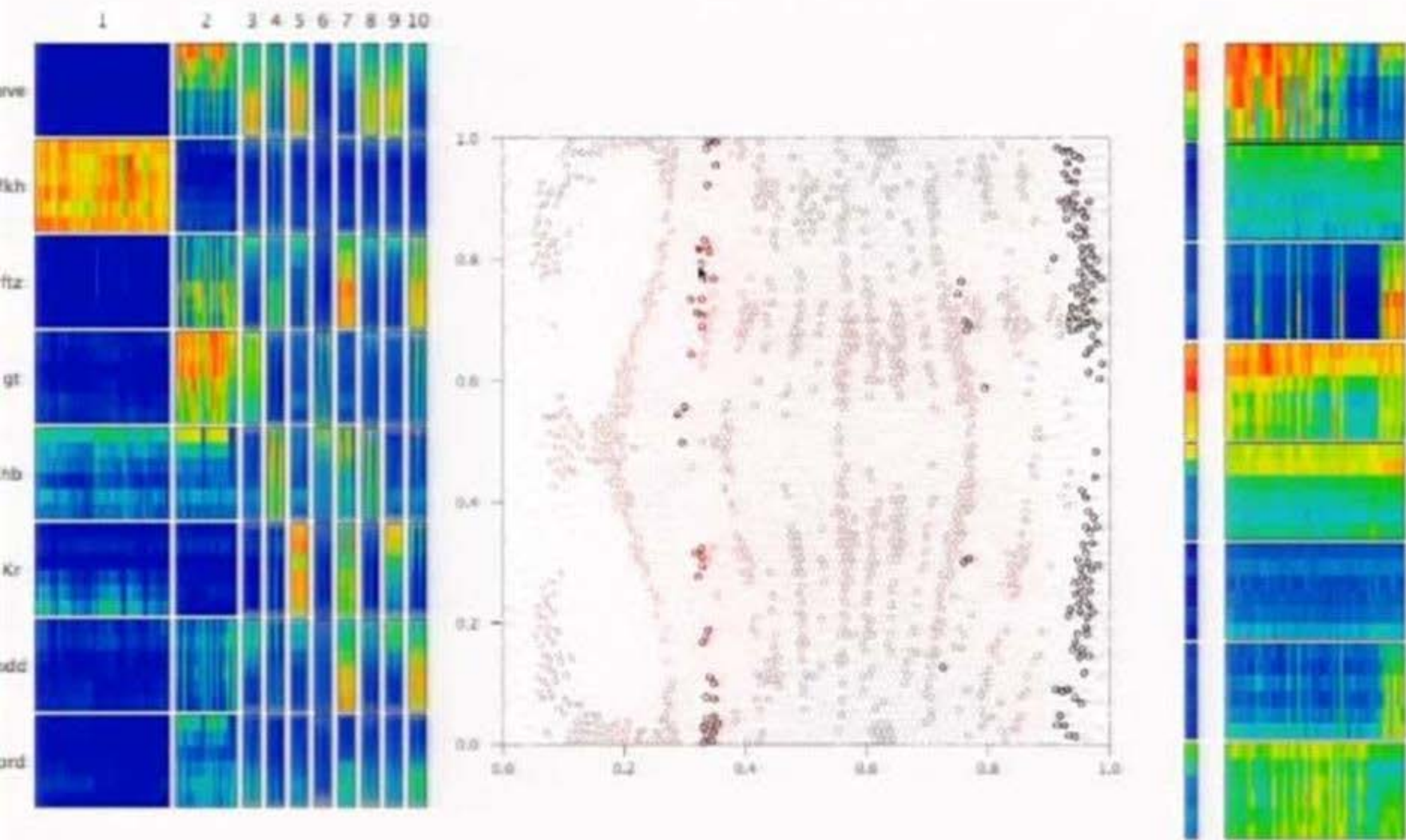












color



density



volume




area



angle



slope



length



position



color



density



volume



area



angle



slope



length



position

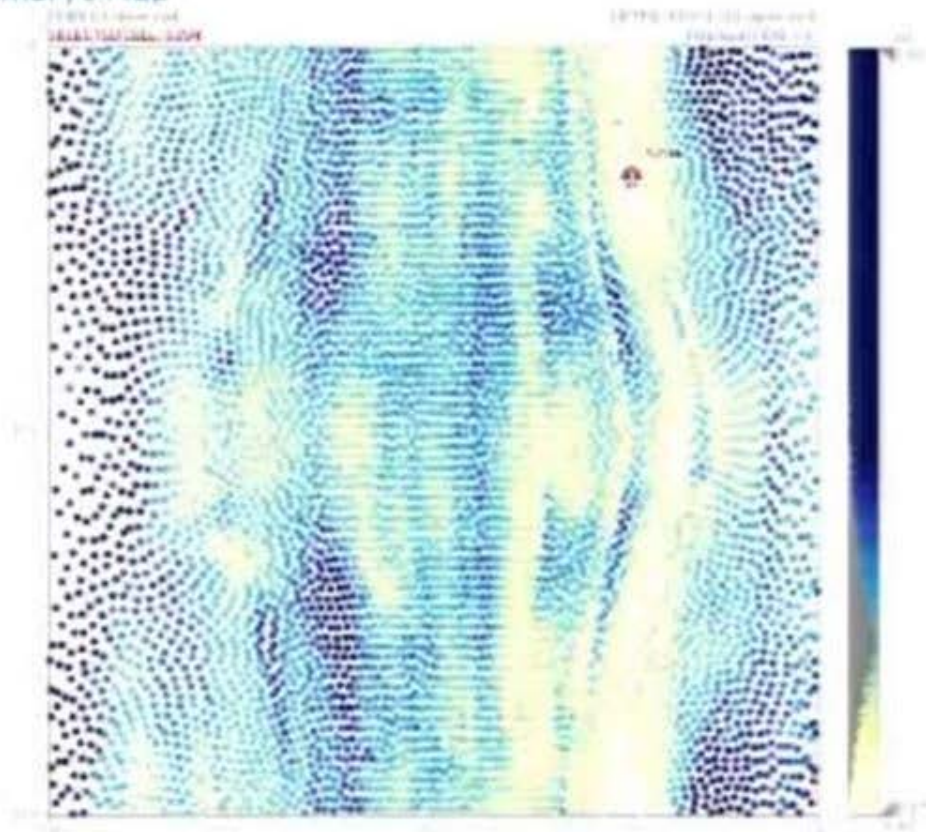




Summaries



Embryo Map



Colormaps

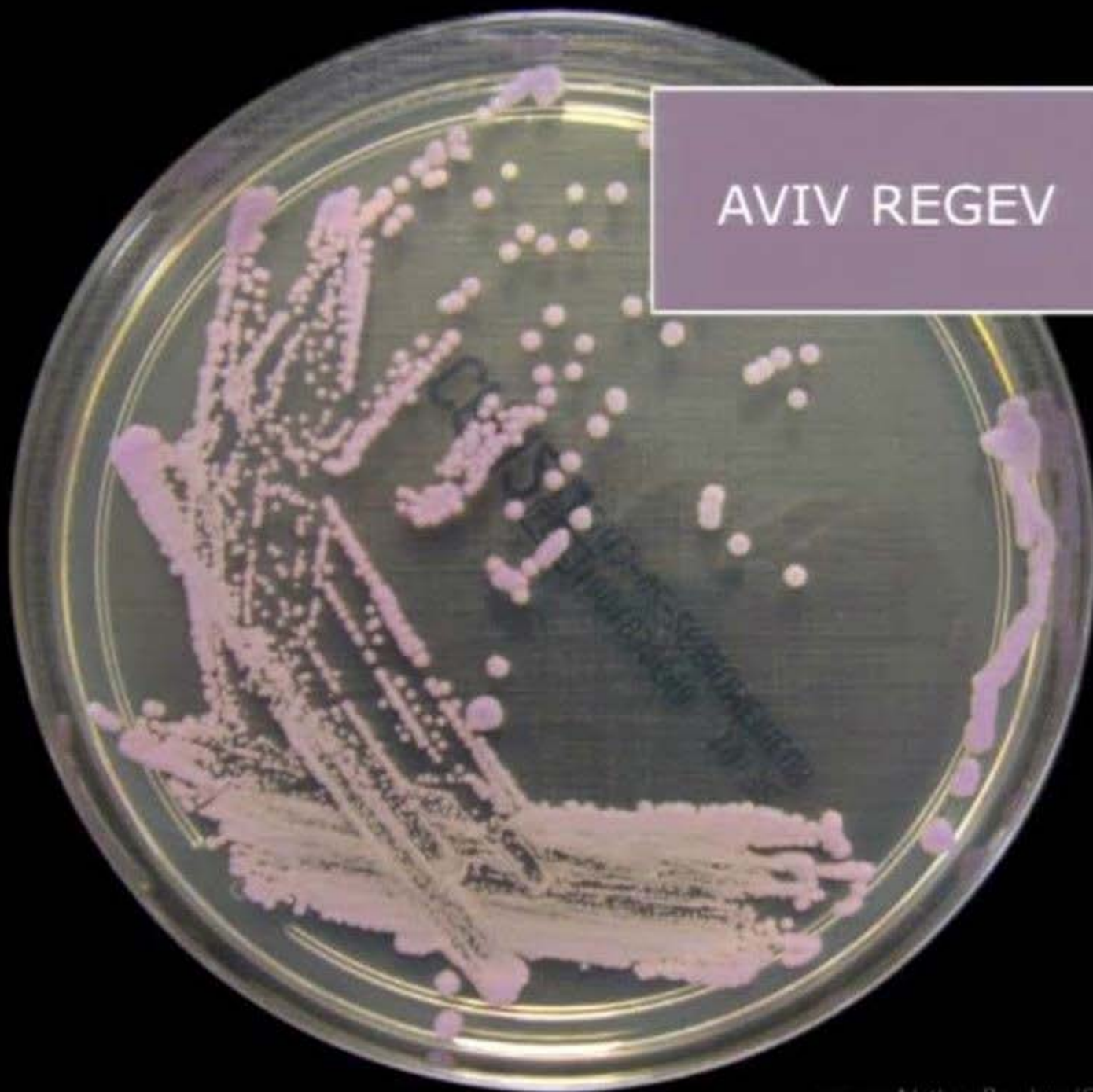
log2(gene) (log)

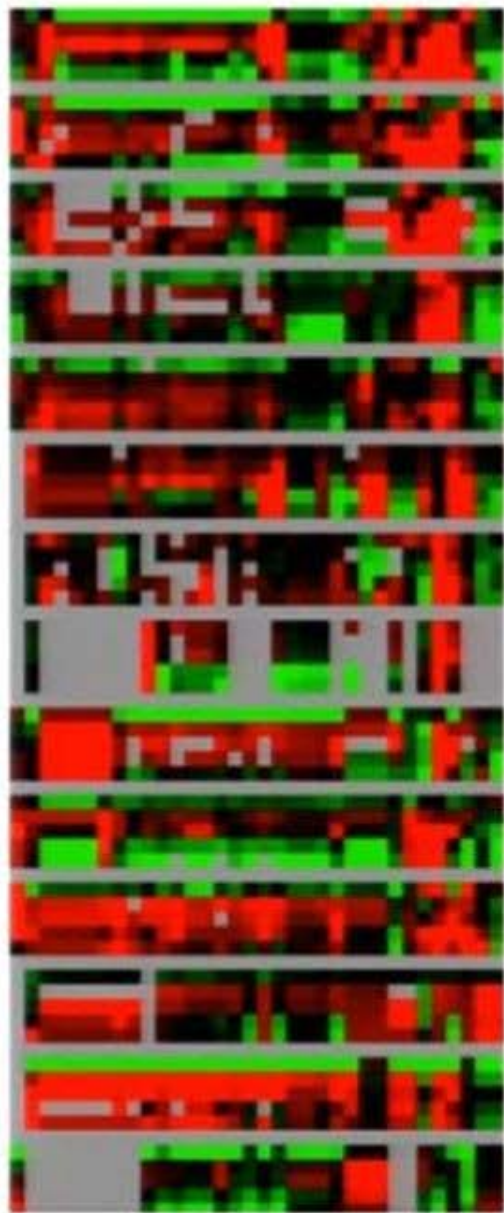
log2(gene)

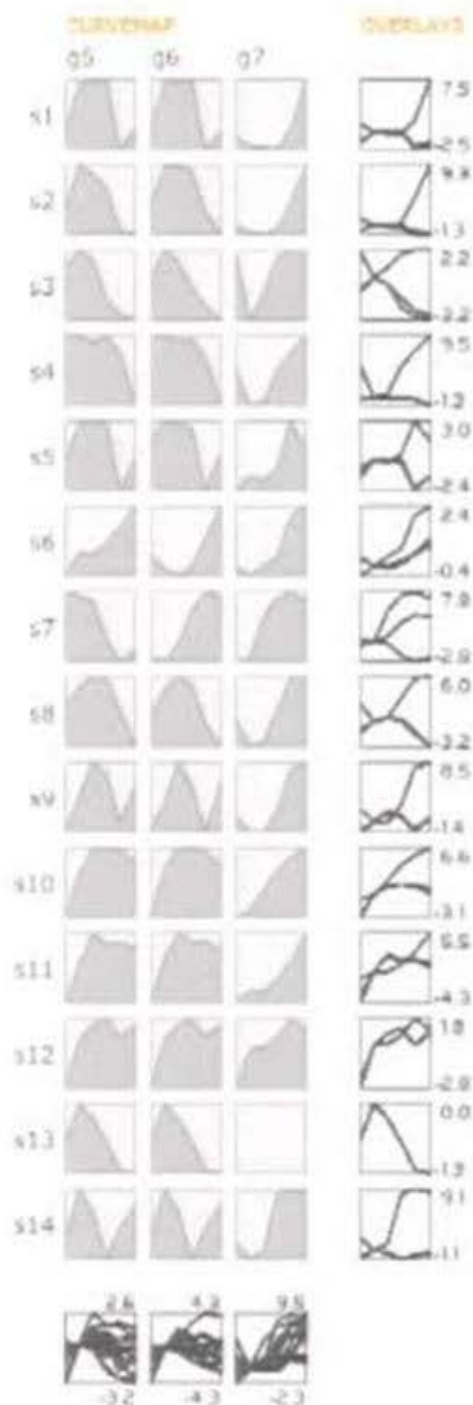
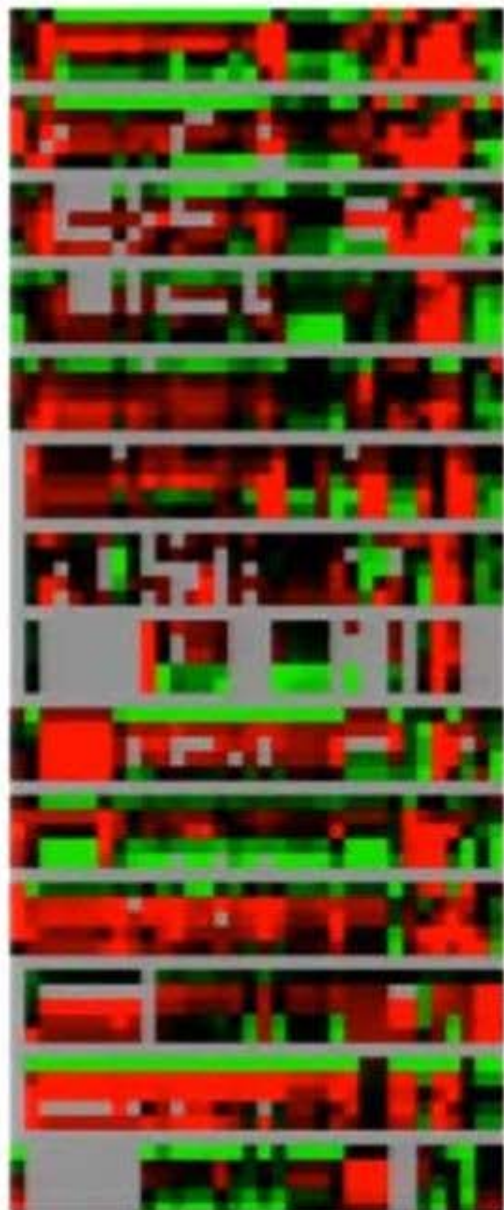
Curvemap



AVIV REGEV







designing for experts is different than
designing for the public

beyond pretty pictures ...

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