

# Variability in Gene Regulation during Cardiomyogenesis

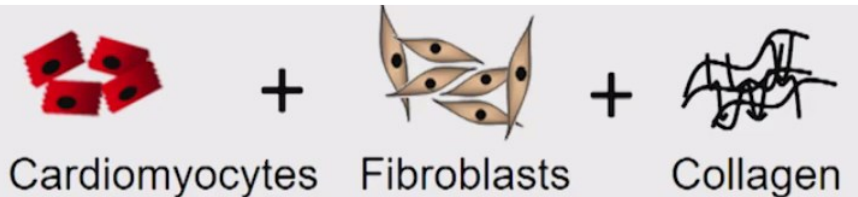
Sebastian Zeidler

Göttingen, March the 7th, 2018

- Congenital heart defects (in infants)
- Acquired cardiovascular diseases e.g. shortness of breath (in elderly)

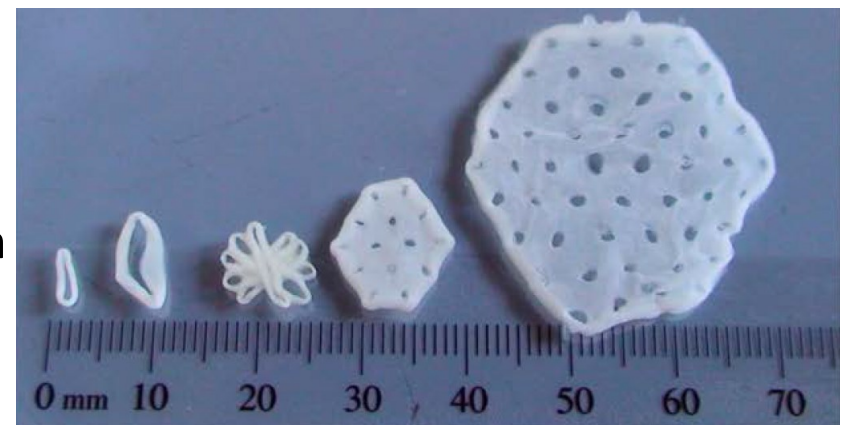


6.5 million patients in Europe  
600.000 new cases per year  
50% die within 5 years

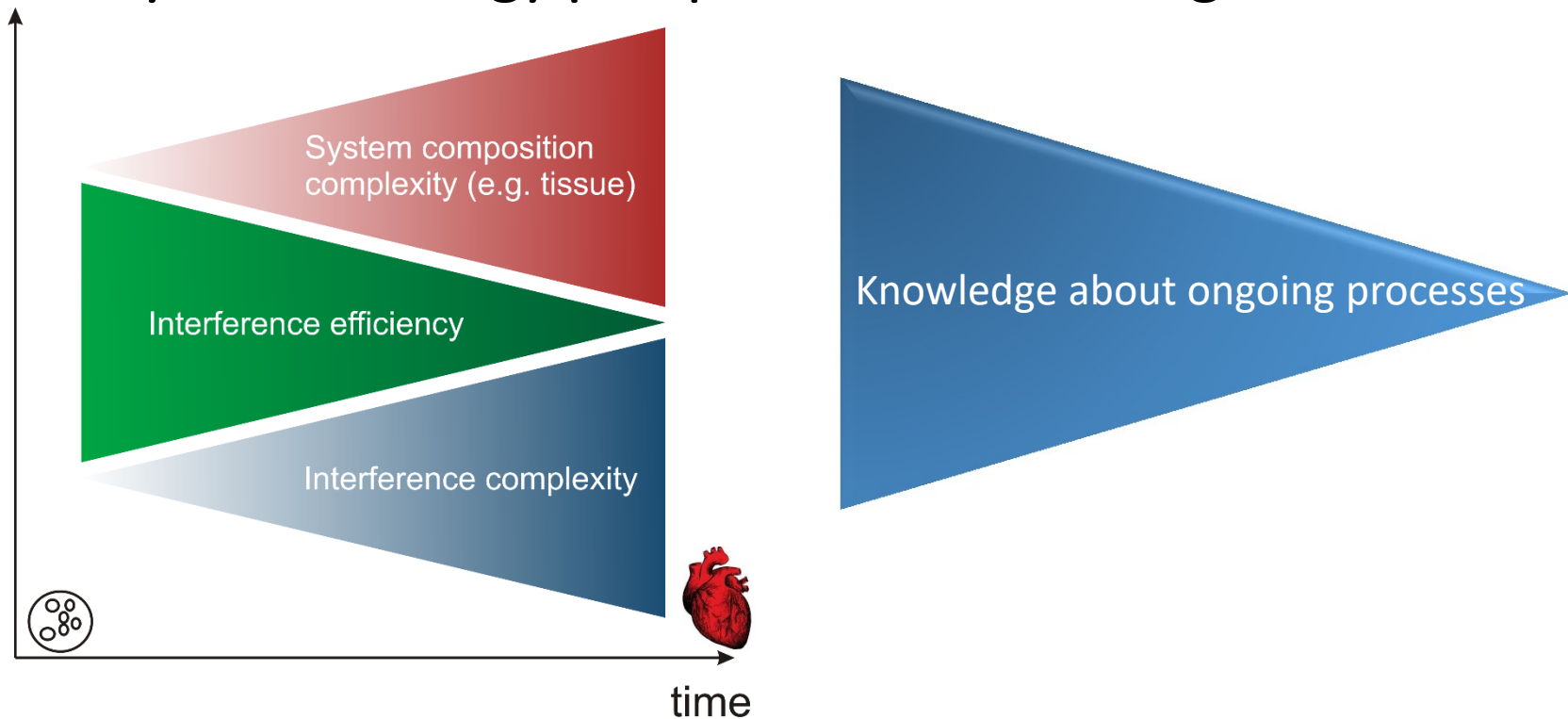


The heart is limited in its regeneration.

Reliable models and tissue replacements are required to improve heart function in patients.



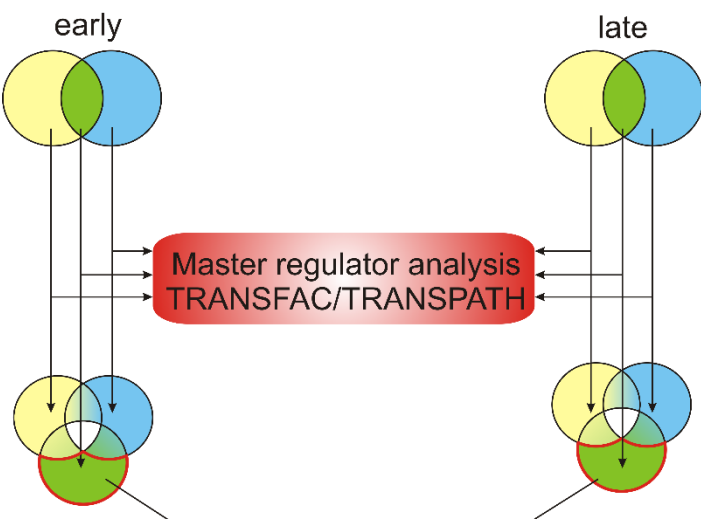
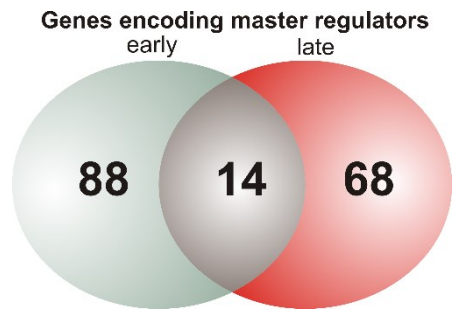
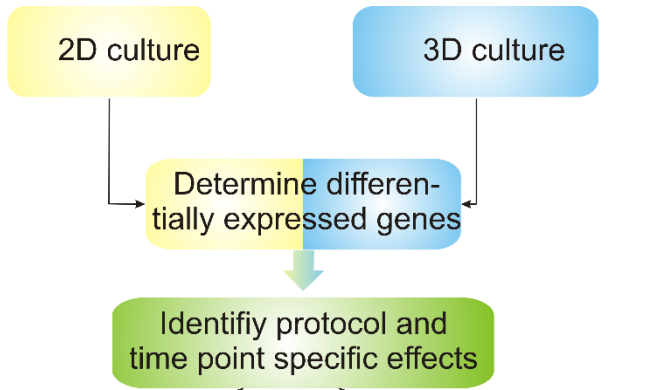
# A systems biology perspective on evolving models



Questions:

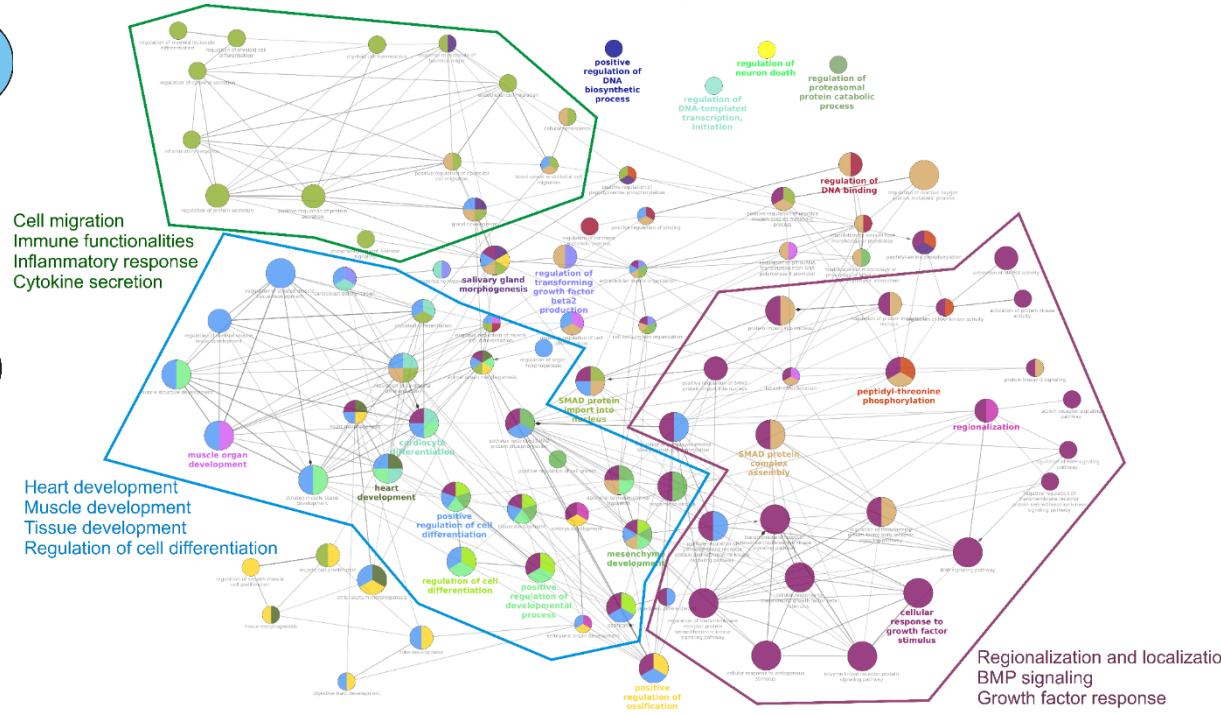
1. Identification of relevant functions in complex tissues?
2. Identification of transcription factor interactions regulating cardiogenesis?

# Functional variability in cardiogenesis

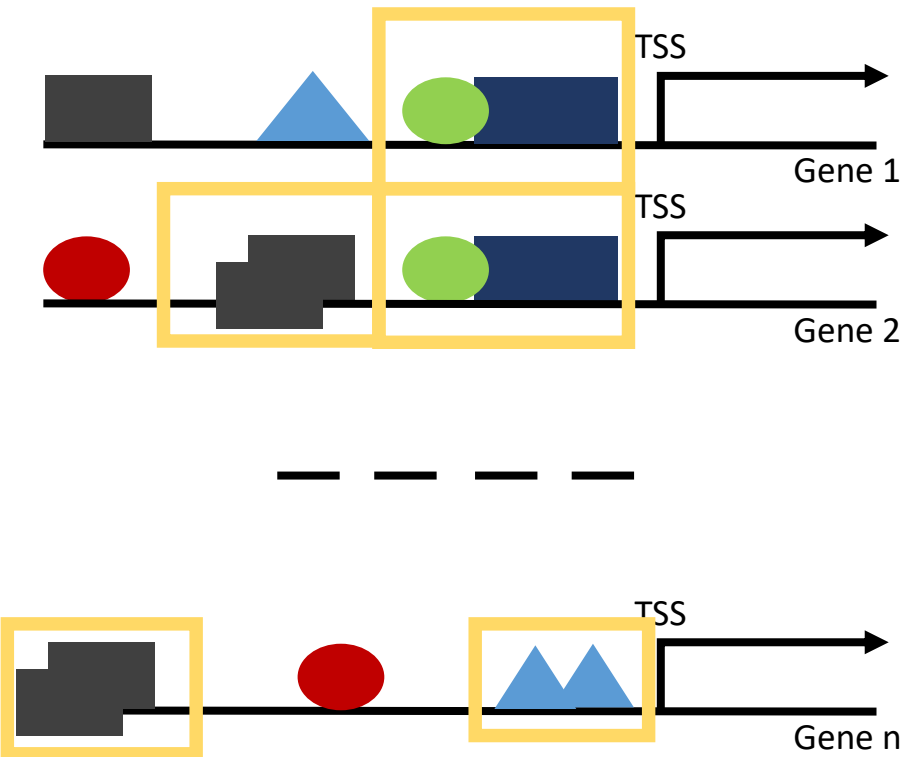


Candidates

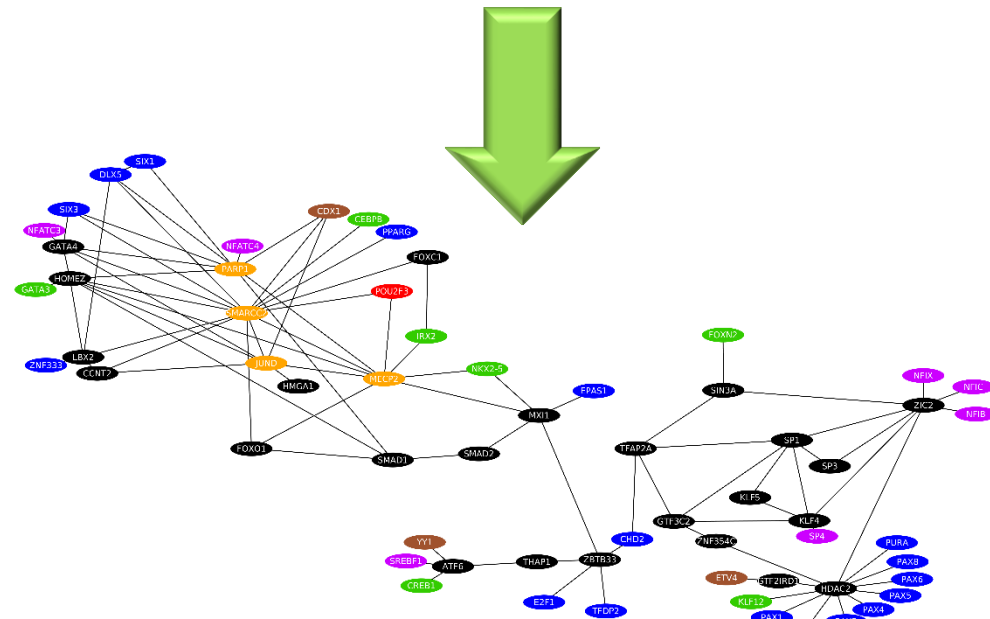
Functional classification



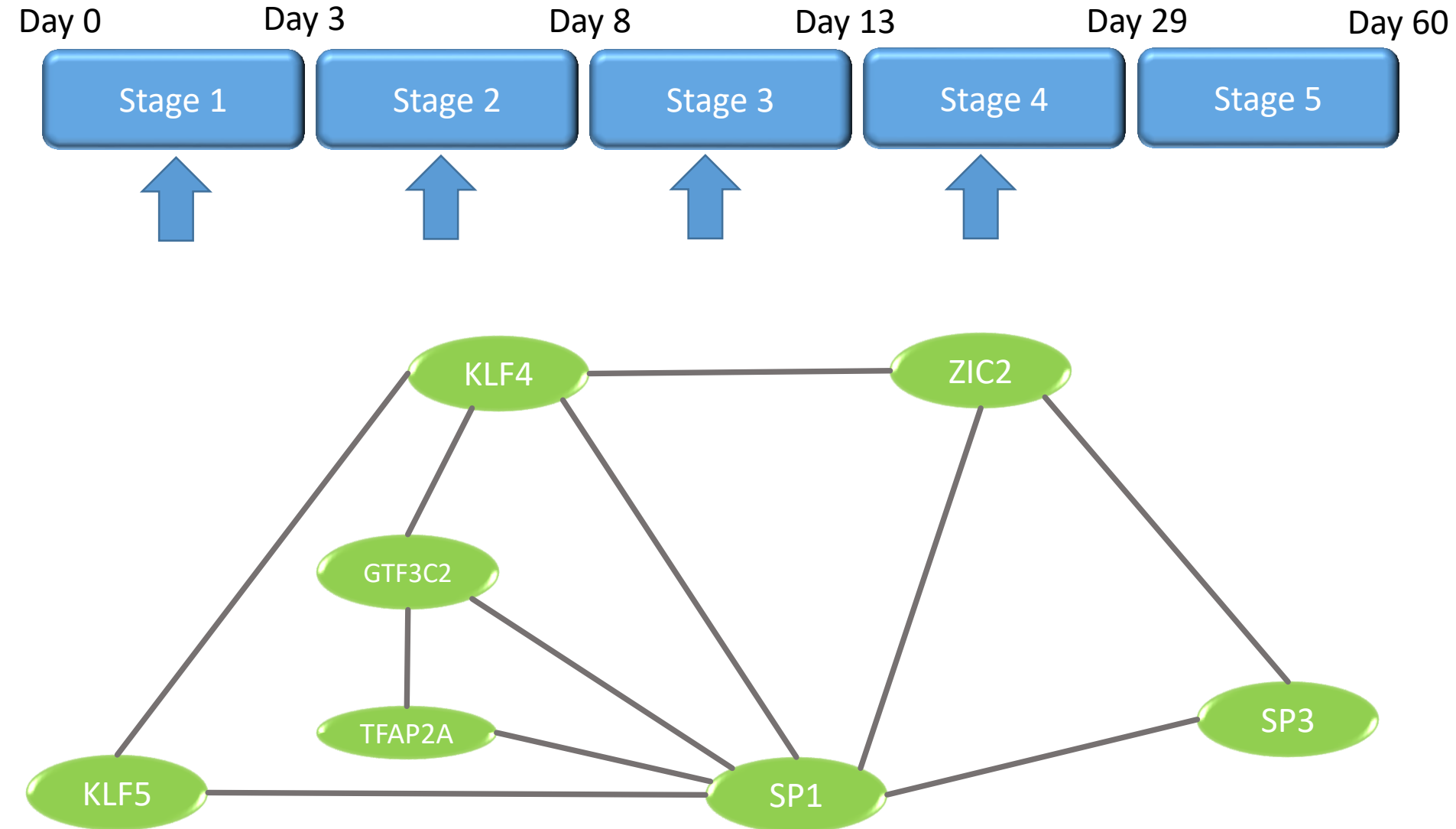
# Identify the variability in TFs regulating cardiogenesis



- PC-TraFF identifies overrepresented TF pairs regulating the input set
- Interactions could be represented in time series networks



# Example of variability in regulation during cardiogenesis



# Summary

## We show that:

- Common cardiogenesis promoting functions were identified across different experimental platforms.
- Overrepresented TF pairs could be identified by using the PC-TraFF approach.
- TFs change their interaction partners during cardiogenesis, which might indicate a development following the hourglass model.

# Thanks

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