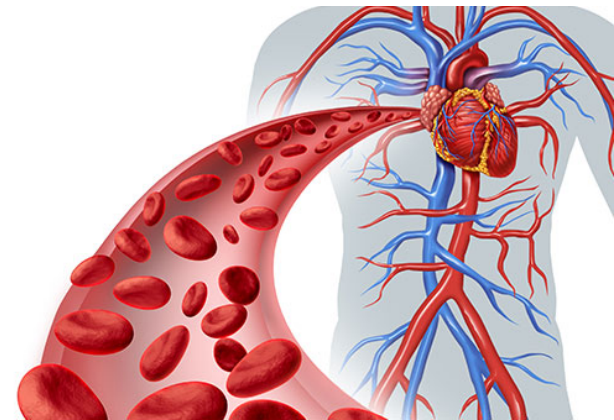


# De boogdialoog - Visie voor de toekomst

Maartje Conijn & Evangeline Warmerdam

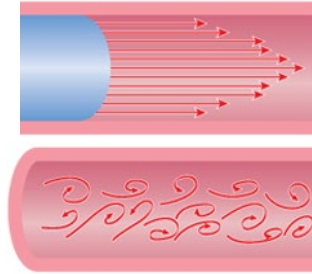
# Beeldvorming van de aorta

- Conventionele technieken (MRI, CT, echo, catherisatie)
  - Dimensies
  - Volumina
  - Drukken
- Bloedstroming



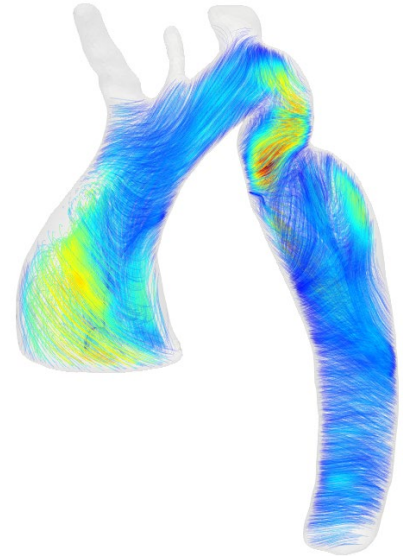
# Bloedstroming

- Veranderde bloedstroming door
  - Aangeboren afwijking
  - Operatie of interventie
- Minder efficiënte bloedstroming
- Meer energie nodig om circulatie op peil te houden
- Verminderde functie van het hart



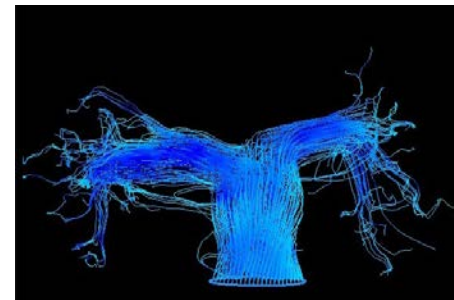
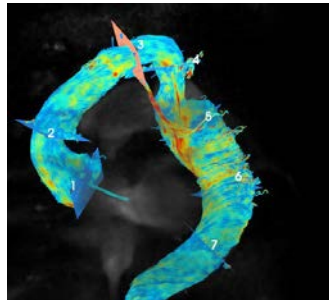
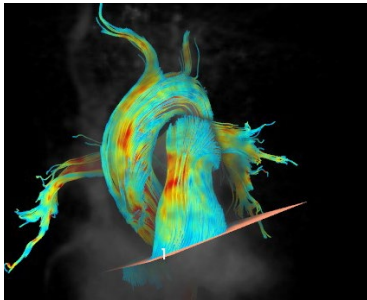
# Bloedstroming analyseren

- Vier-dimensionele flow MRI
  - Nieuwe MRI techniek
  - Metingen doen van de bloedstroming
- Computational fluid dynamics
  - Simuleren van de bloedstroming

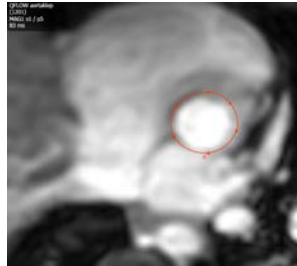
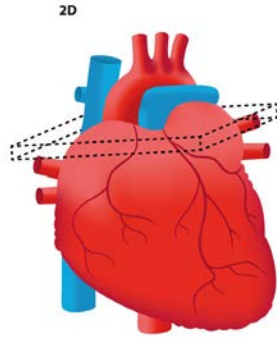


# 4D-flow MRI

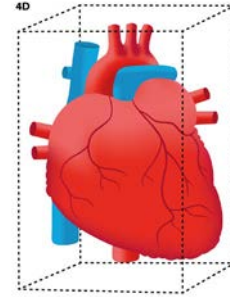
- Nieuwe MRI techniek
- Gedetailleerd in beeld brengen bloedstroming
- Meten hemodynamische parameters



# 4D flow MRI – wat is er nieuw?

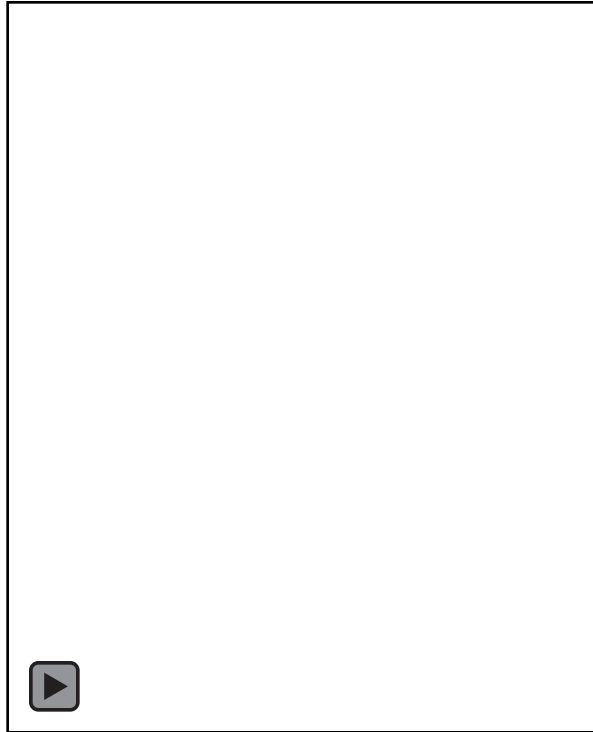


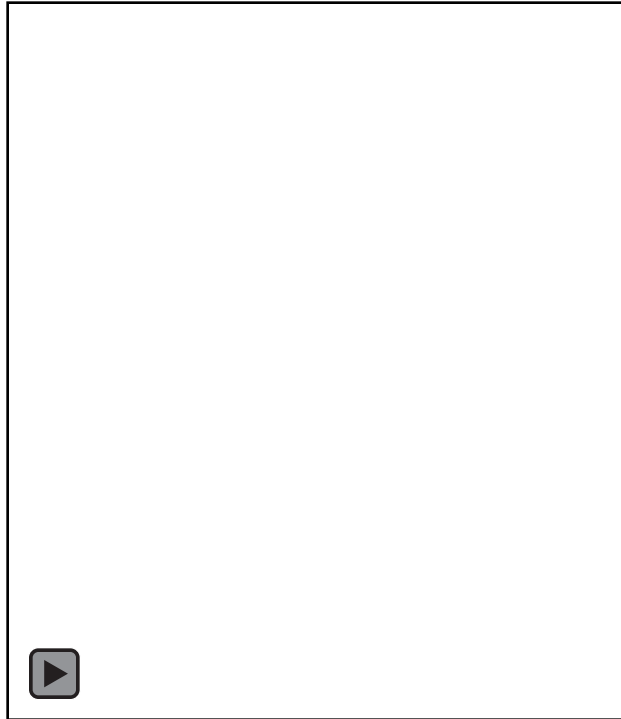
Hoeveelheid  
Snelheid

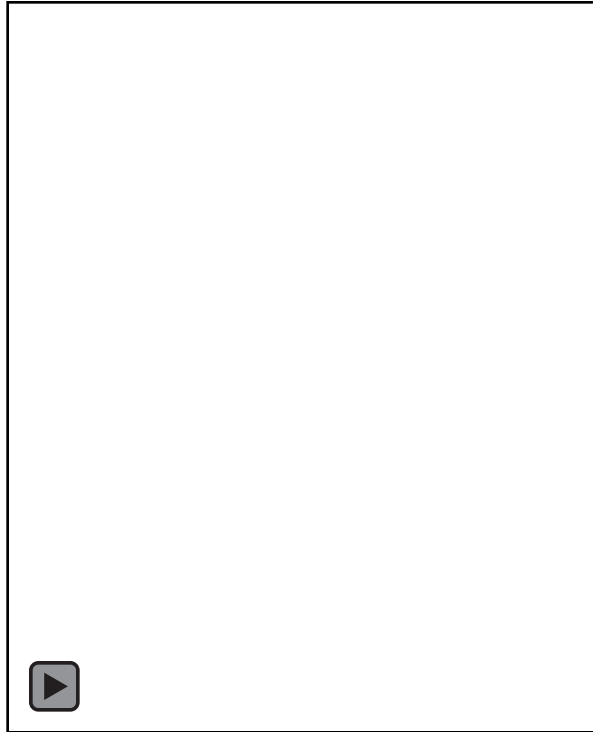


Richting  
Vaatwandspanning  
Energieverlies





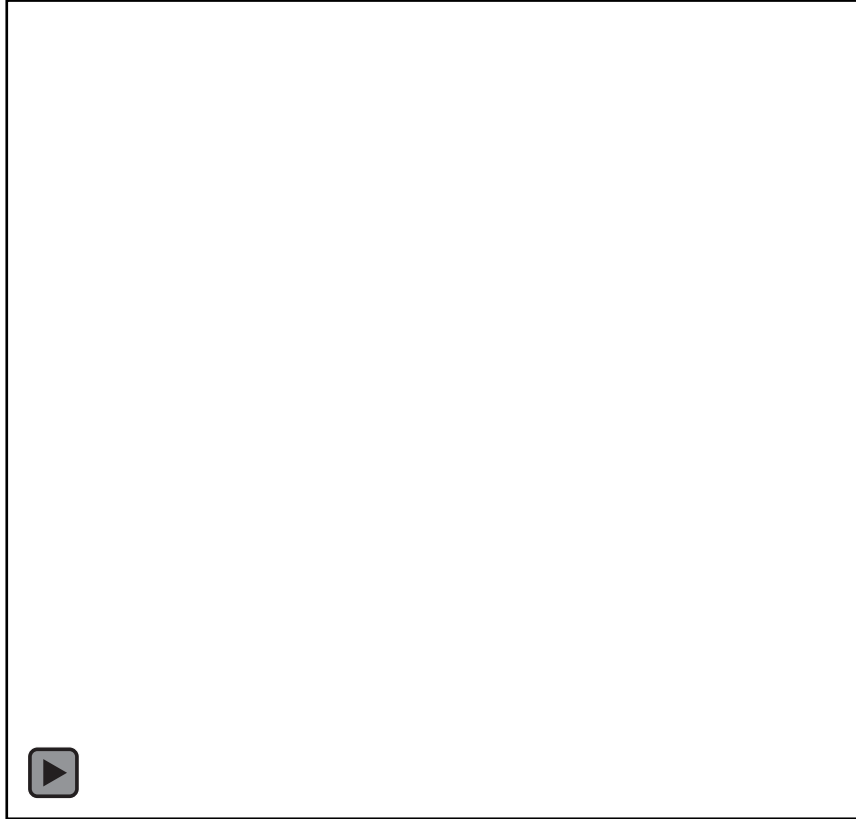




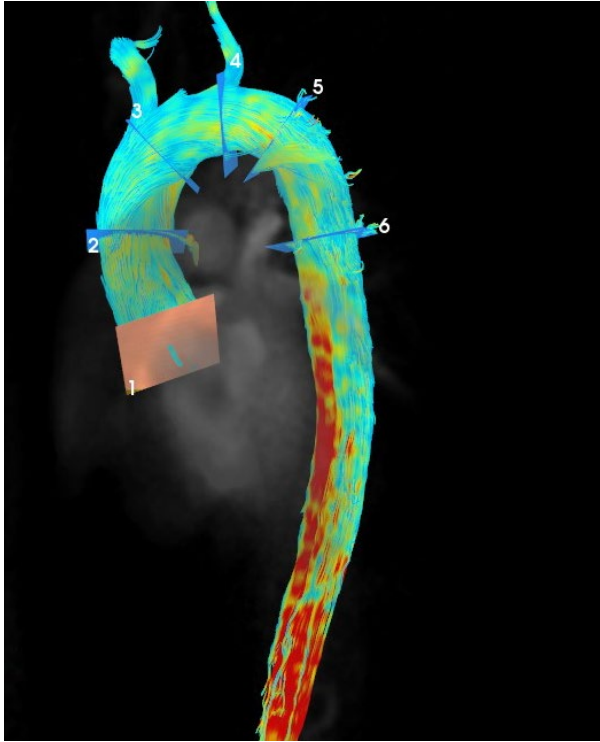
# 4D flow MRI – toepassing

- Bicuspide aortaklep
- Afwijkende bloedstroming → verwijding van de aorta
- Kunnen we dit eerder opsporen?





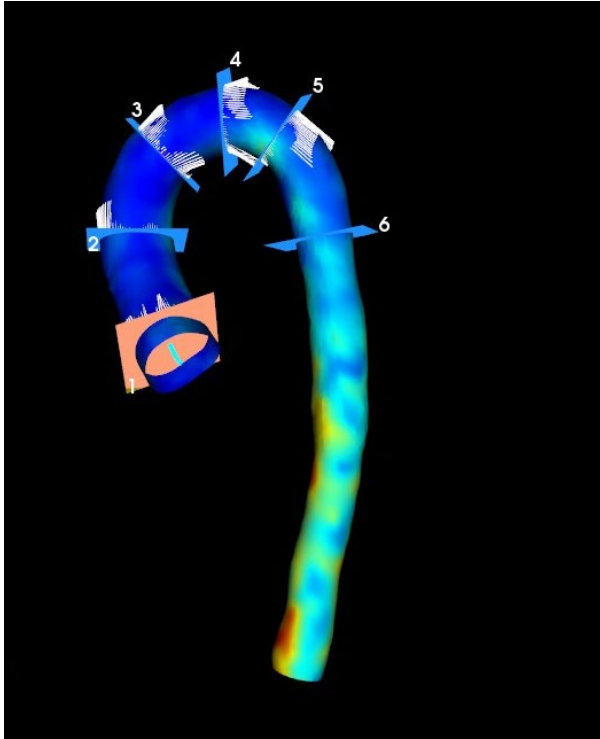
## Gezonde aorta(klep)



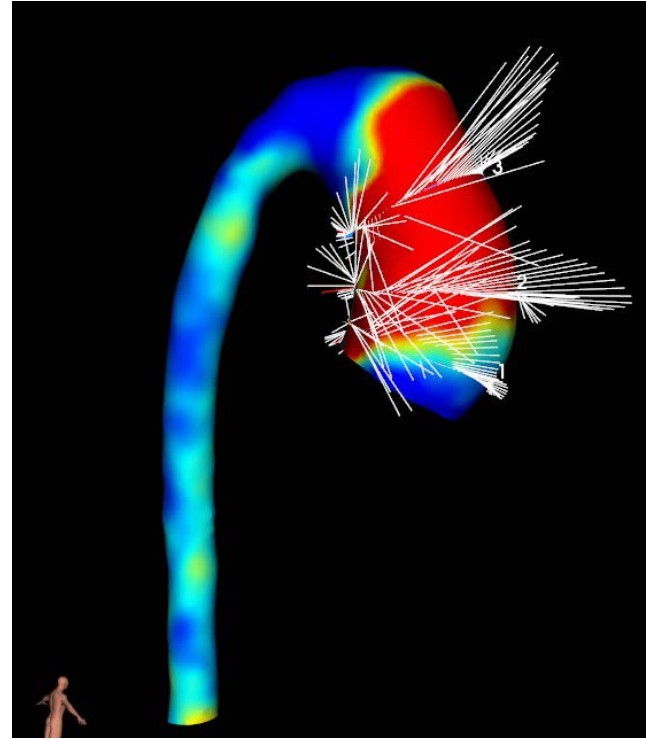
## Bicuspide aortaklep



## Gezonde aorta(klep)



## Bicuspide aortaklep



# De boogdialog – visie voor de toekomst

## Deel 2

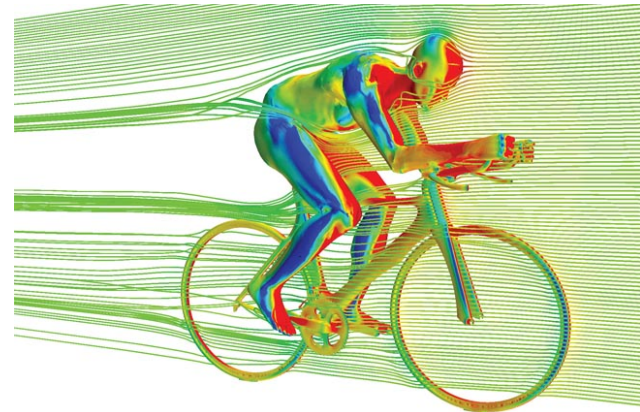
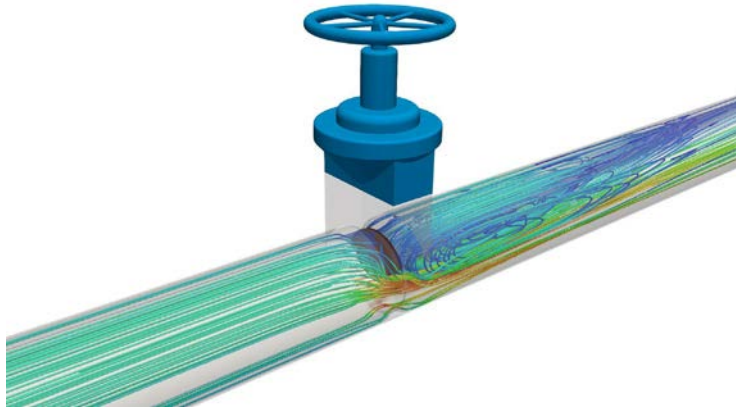
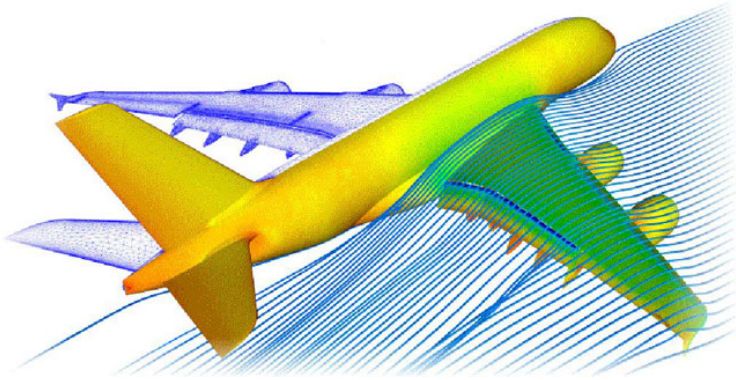




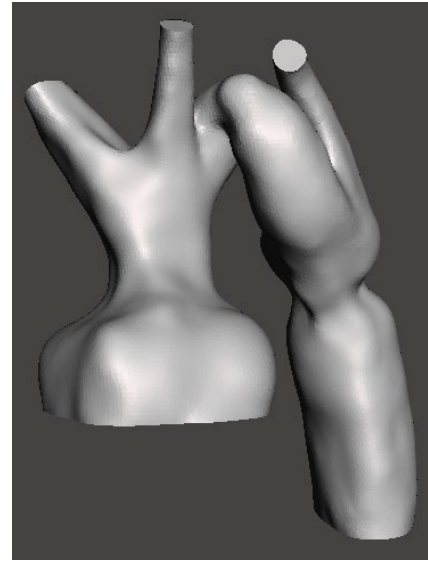
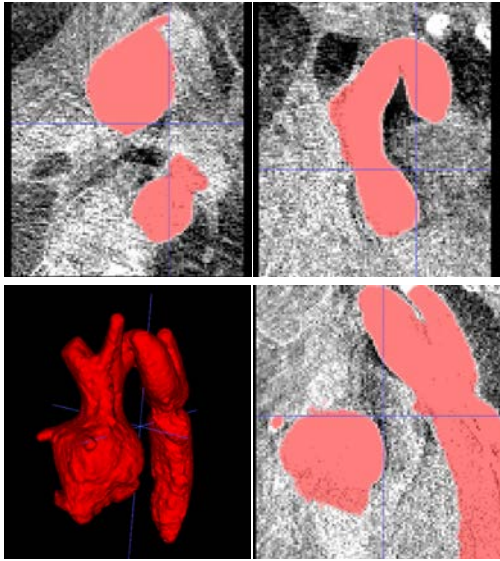
# Computational Fluid Dynamics (CFD) bij aangeboren hartafwijkingen



# Computational Fluid Dynamics (CFD)



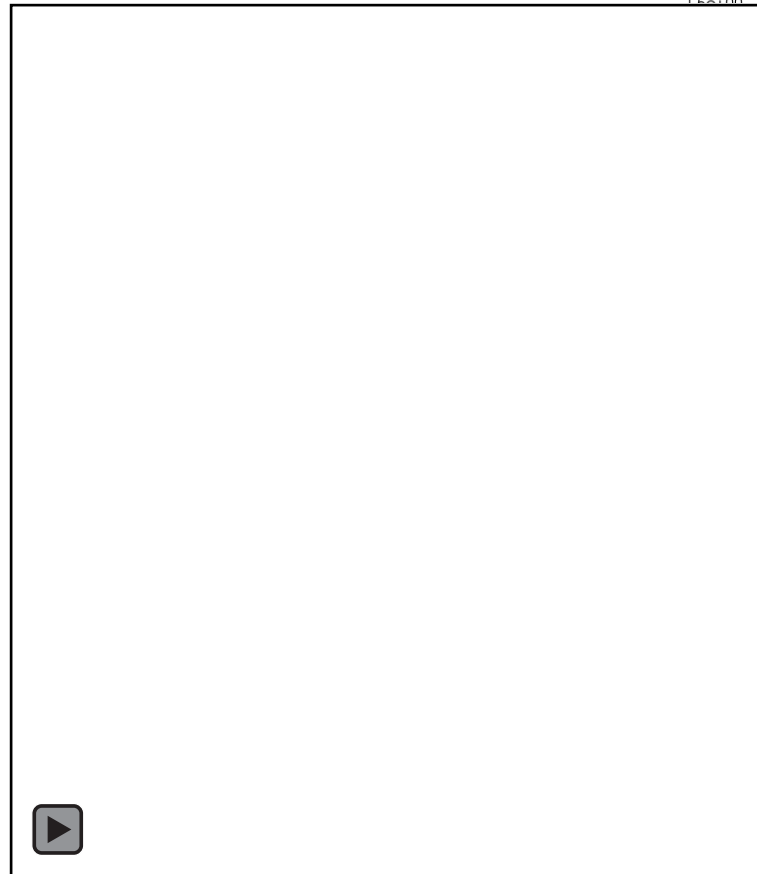
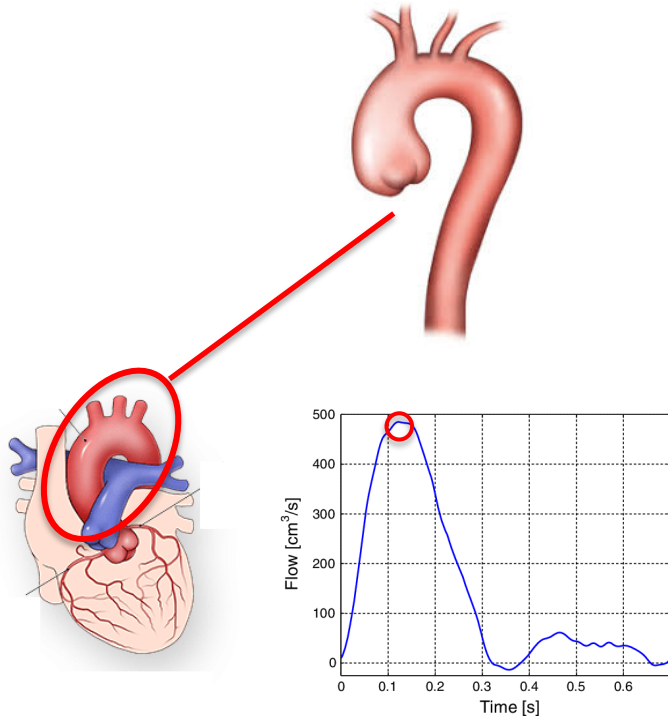
# Computational Fluid Dynamics (CFD)



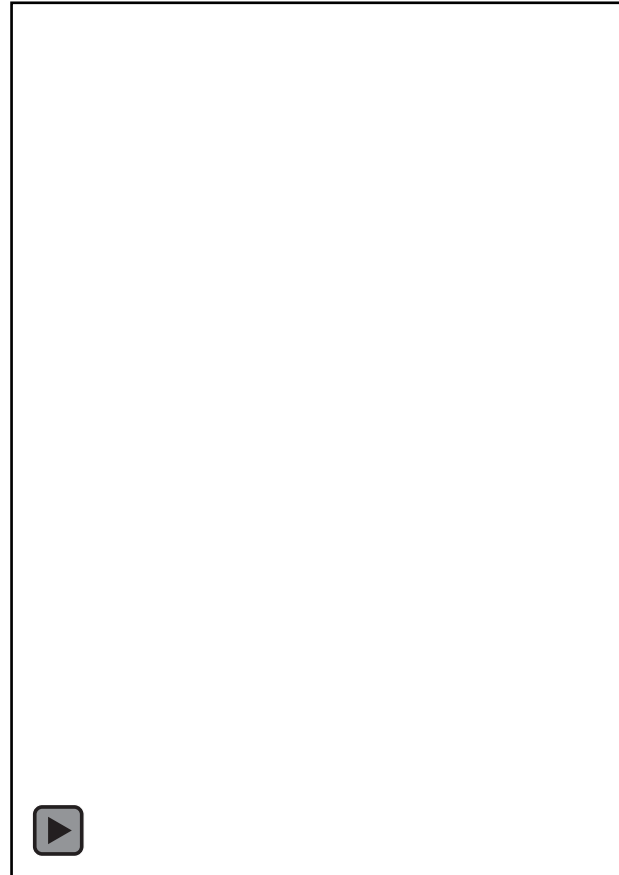
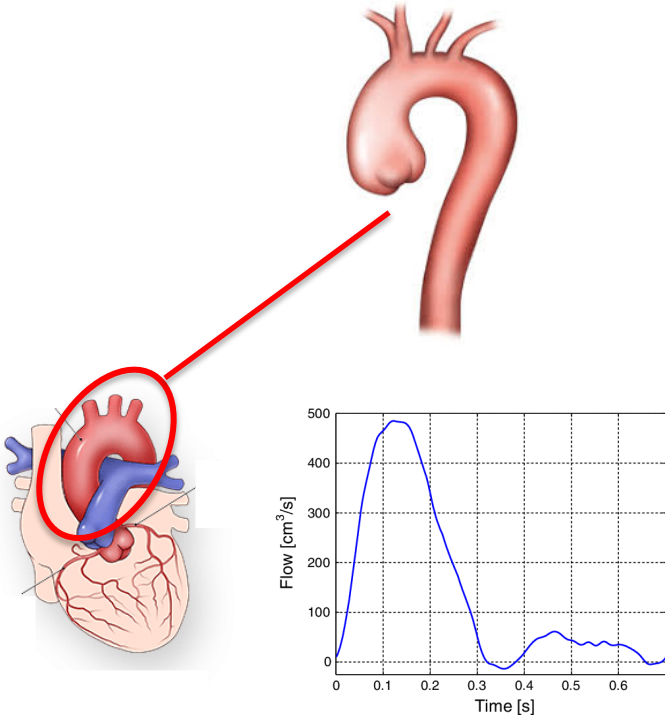


Shutterstock

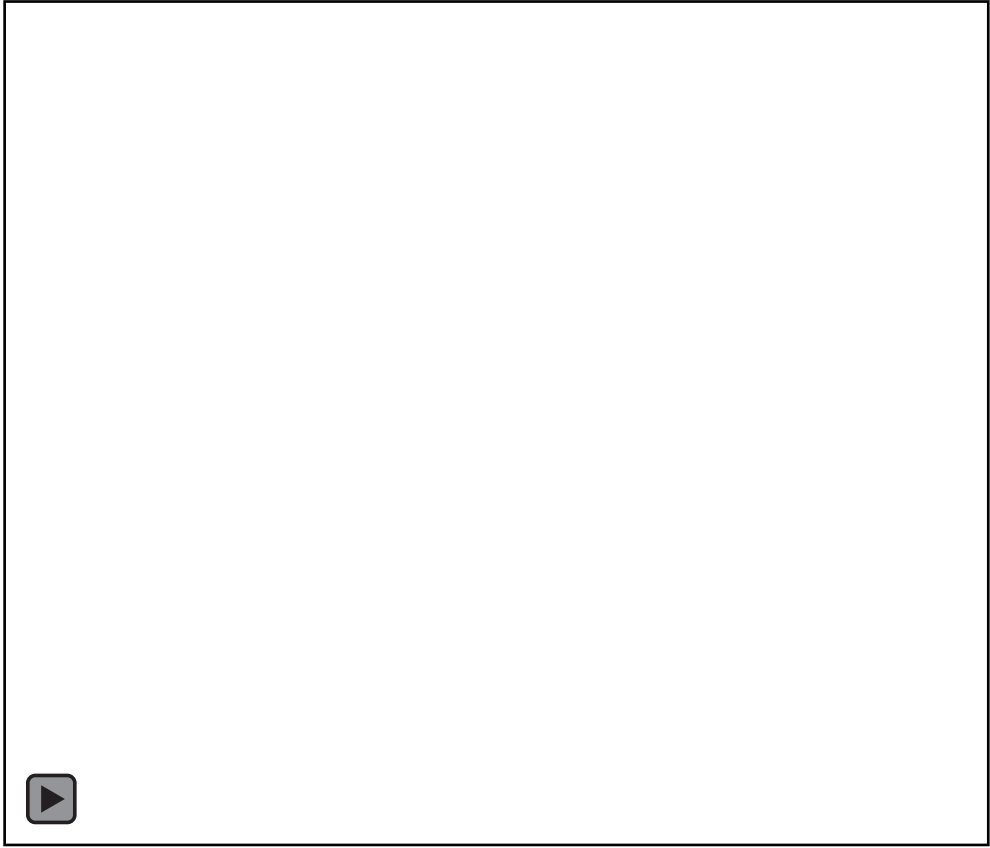
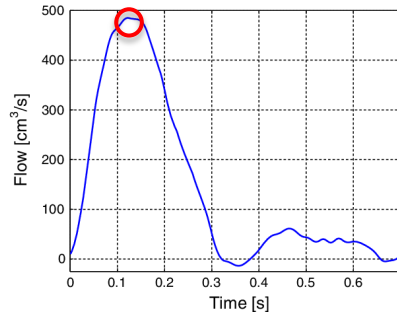
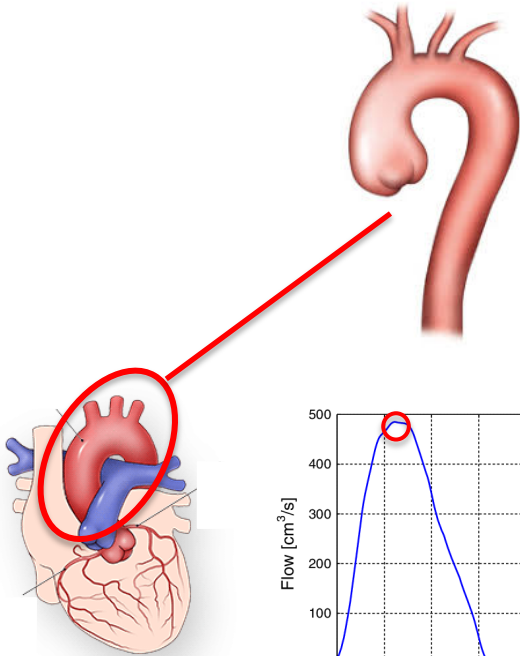
# Computational Fluid Dynamics (CFD)



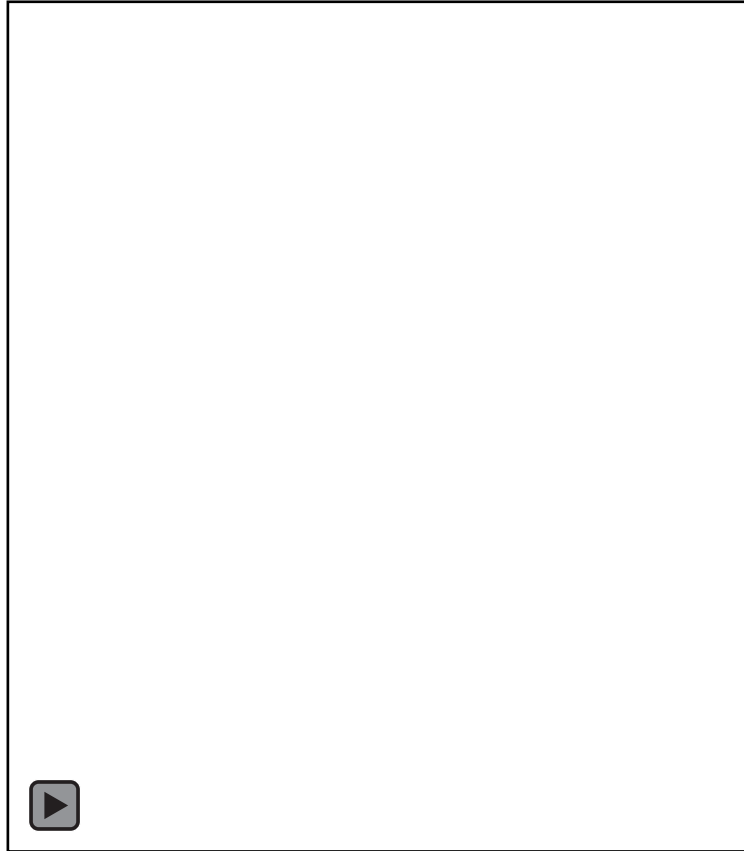
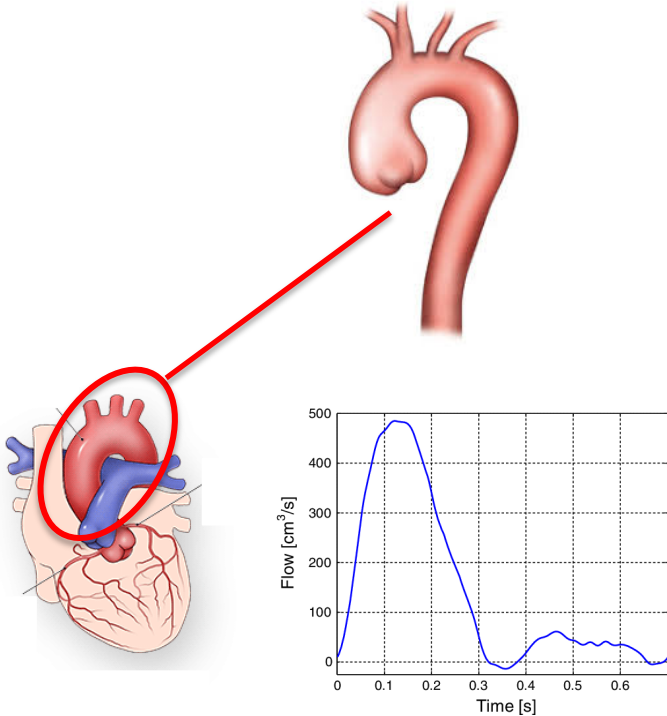
# Computational Fluid Dynamics (CFD)



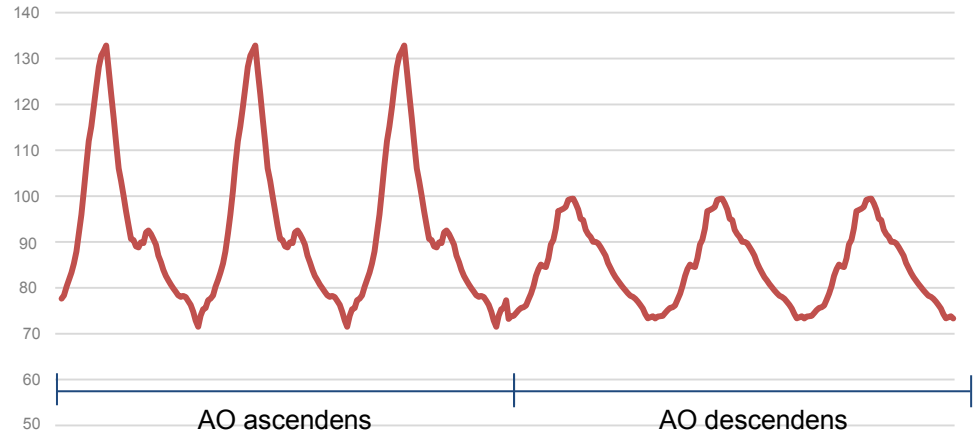
# Computational Fluid Dynamics (CFD)



# Computational Fluid Dynamics (CFD)



# Computational Fluid Dynamics (CFD)



# Computational Fluid Dynamics (CFD)

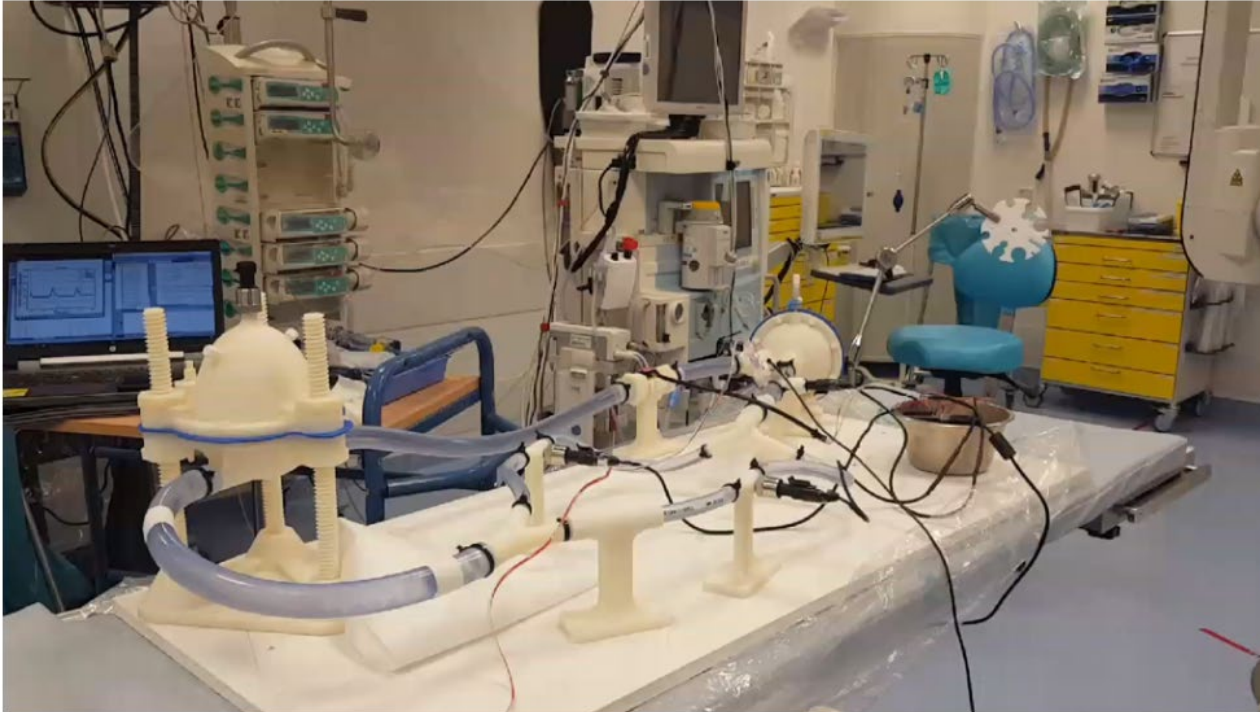
- Resolutie onbeperkt
- Gedetailleerde informatie over alle parameters inclusief druk
- Mogelijkheid tot analyse na stentplaatsing
- Simuleren van ingreep
- Simuleren van inspanning
- Onderzoeken van flow gerelateerde complicaties



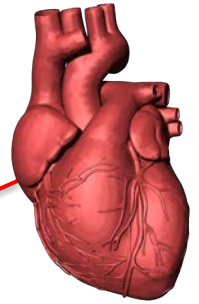
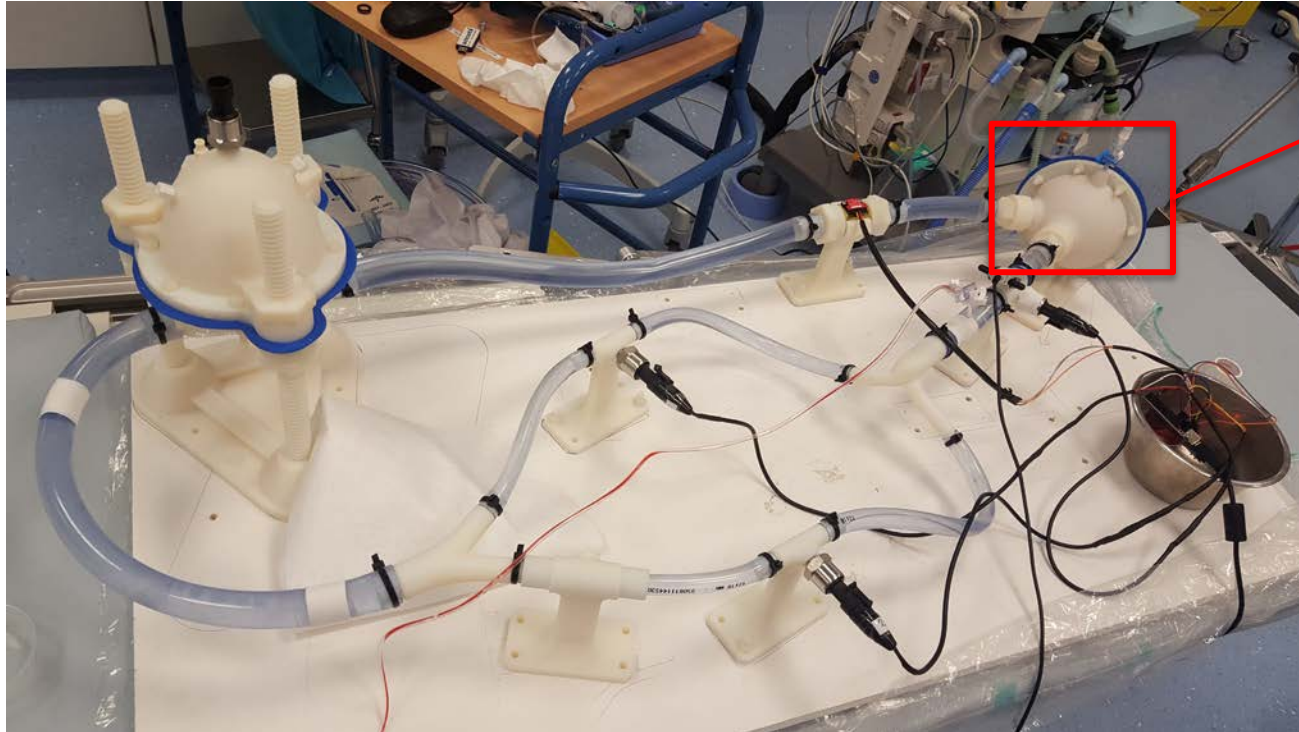
# Kloppen die berekeningen wel?



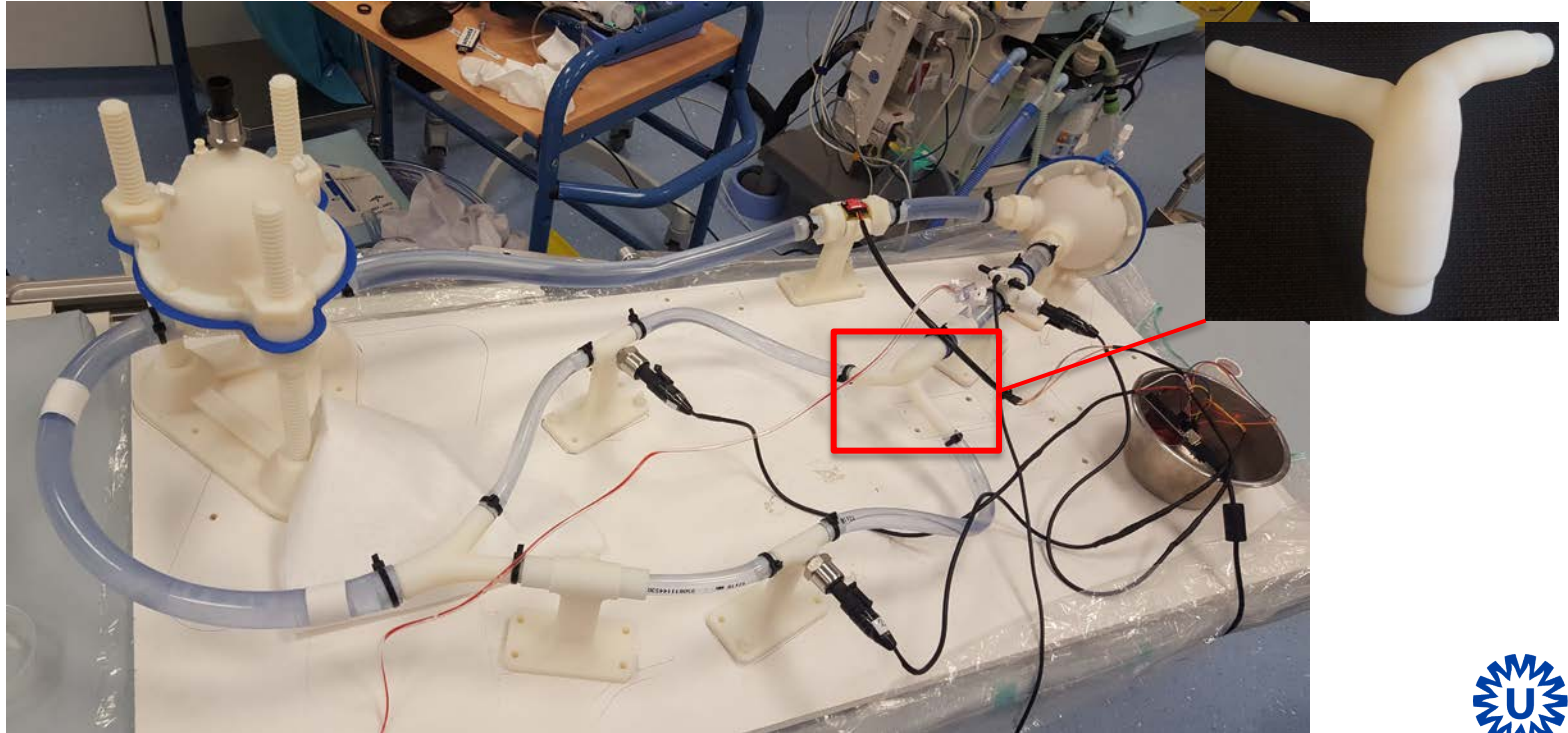
# Validatie van CFD – Ontwikkeling hartpomp



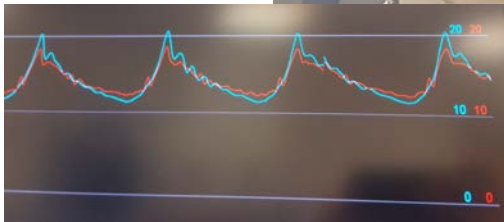
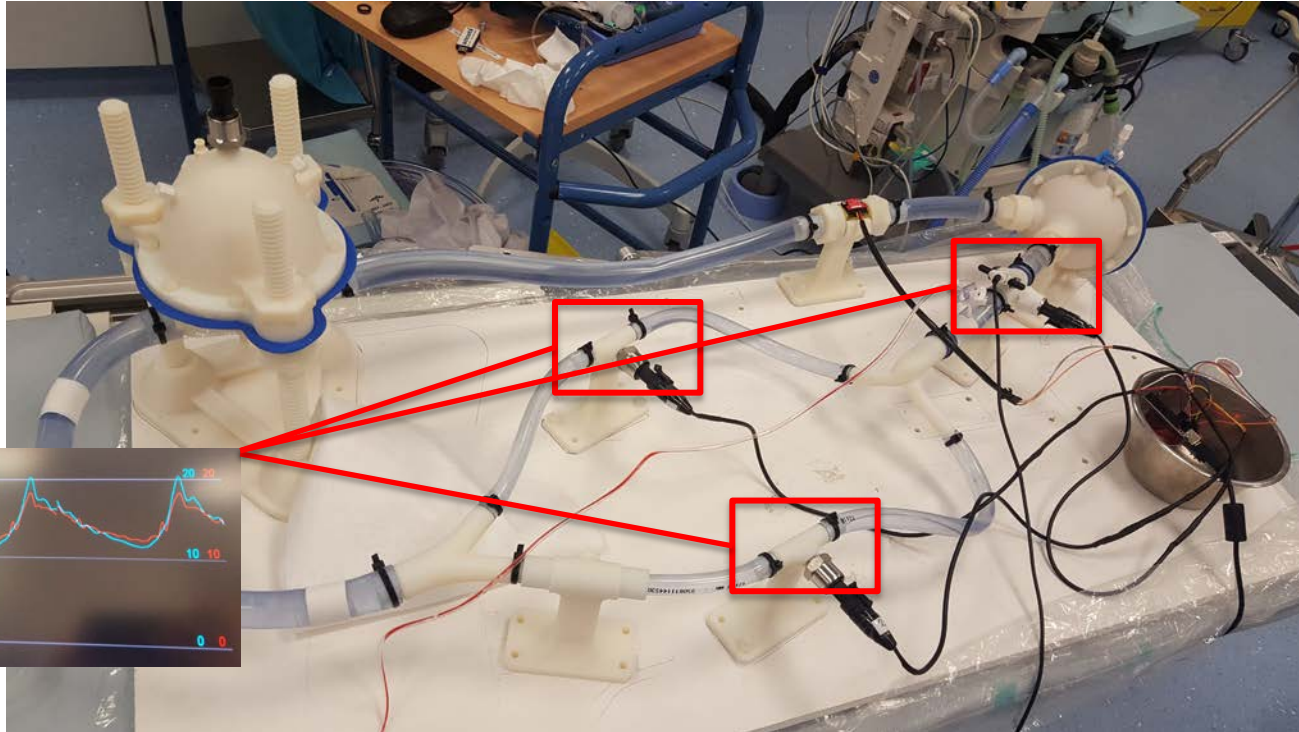
# Validatie van CFD – Ontwikkeling hartpomp



# Validatie van CFD – Ontwikkeling hartpomp



# Validatie van CFD – Ontwikkeling hartpomp





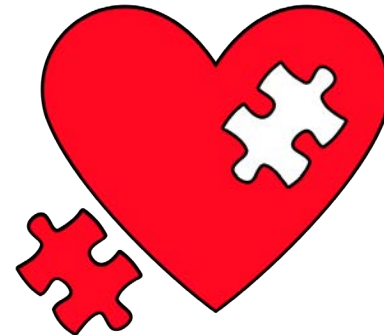
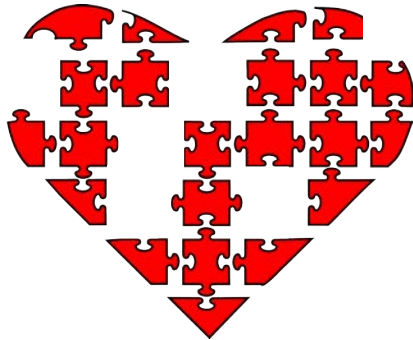
# Validatie van CFD – Ontwikkeling hartpomp

- Controleerbare omgeving
- Vergelijken van CFD resultaten met beschikbare technieken
- Geen belasting voor de patient



# Conclusie

- 4D flow MRI en CFD beeldvormende technieken van de toekomst
- Voor beter begrijpen en zichtbaar maken van complexe stromingen



# Team

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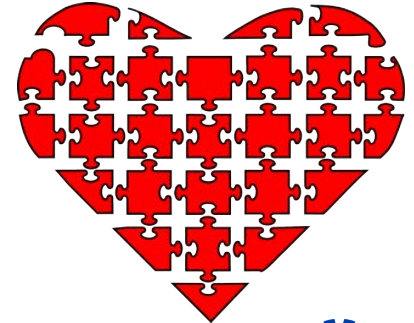
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Drs. F.M. Rijnberg  
Dr. H. van Assen

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Dorita Dekkers

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Stichting Hartekind



# Bedankt voor uw aandacht!

