

nox medical

Gervigreind og Svefnrannsóknir



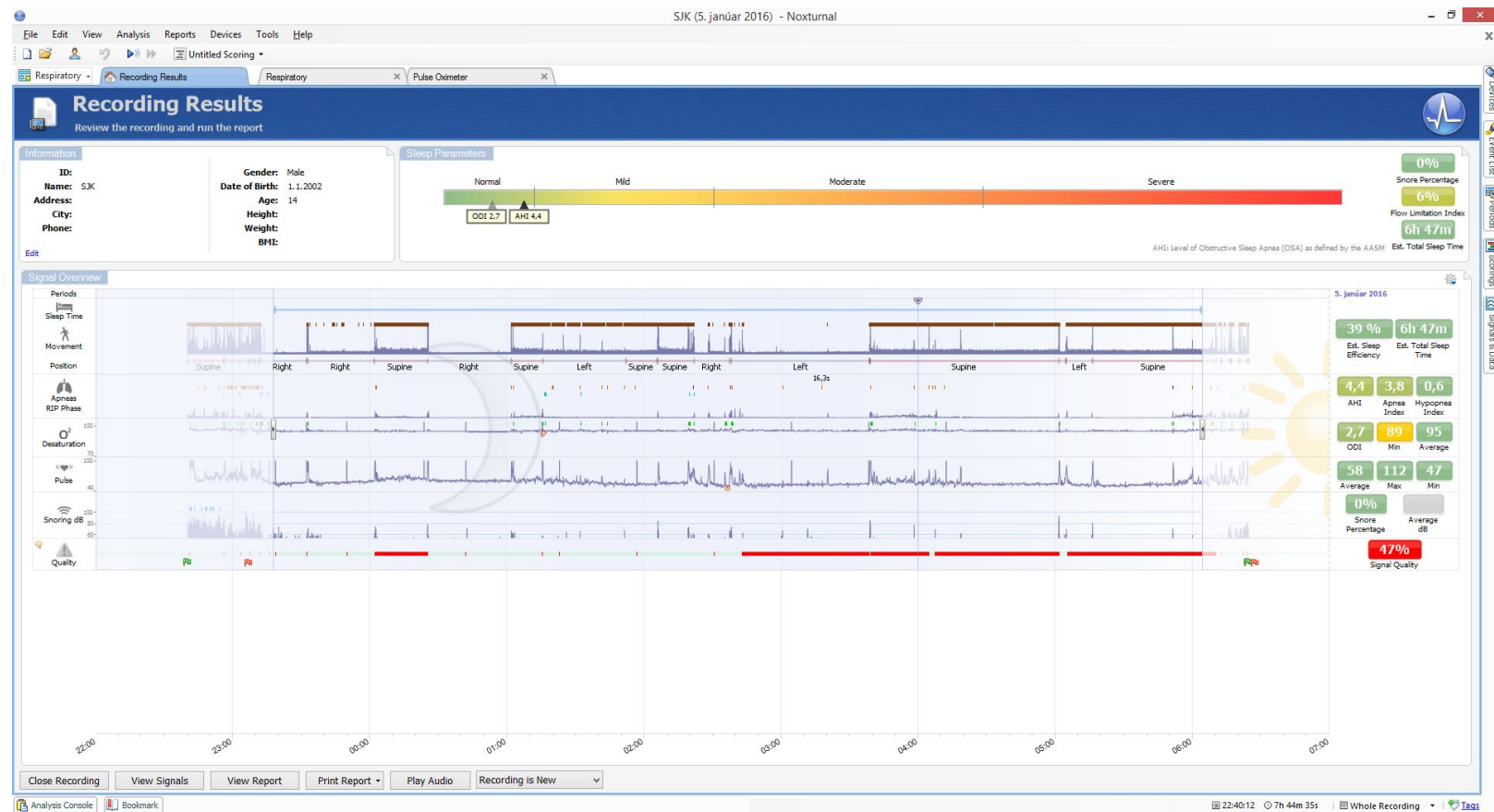
Eysteinn Finnsson

Nox Medical



- Stofnað 2007
- Yfir 50 starfsmenn
- Þróar, skráir og selur lækningatæki til að greina svefnraskanir
- Leiðandi á heimsvísu í svefnlæknisfræðum

Vél- og hugbúnaður hannaður frá grunni



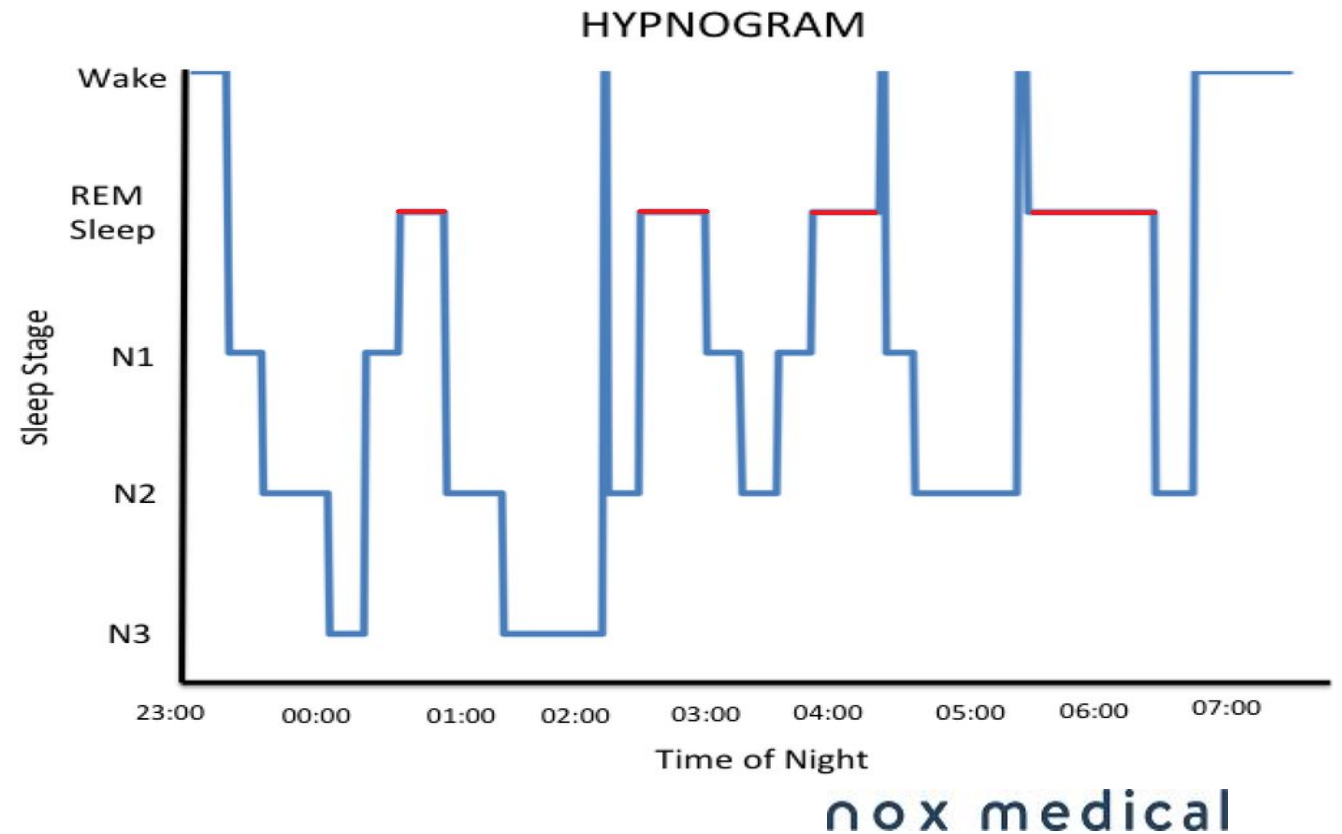
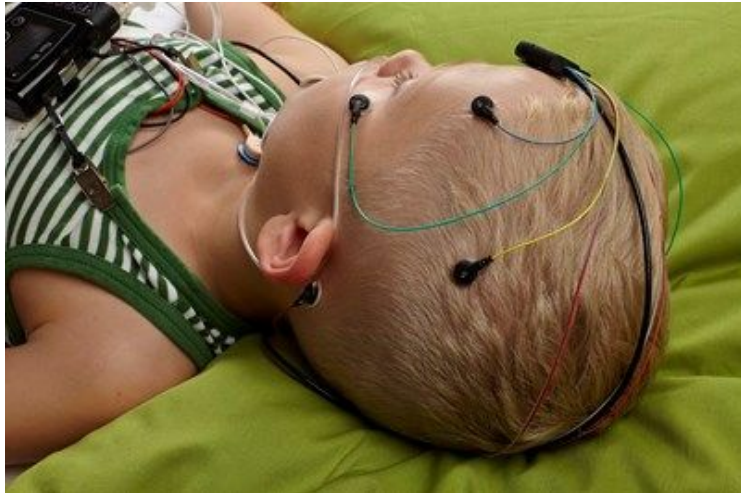
Svefn er

- Grundvöllurinn fyrir góða heilsu
- Flókið fyrirbæri
 - Langtímaminningar
 - Mikilvægur fyrir ónæmiskerfið
 - Endurheimt og uppbygging

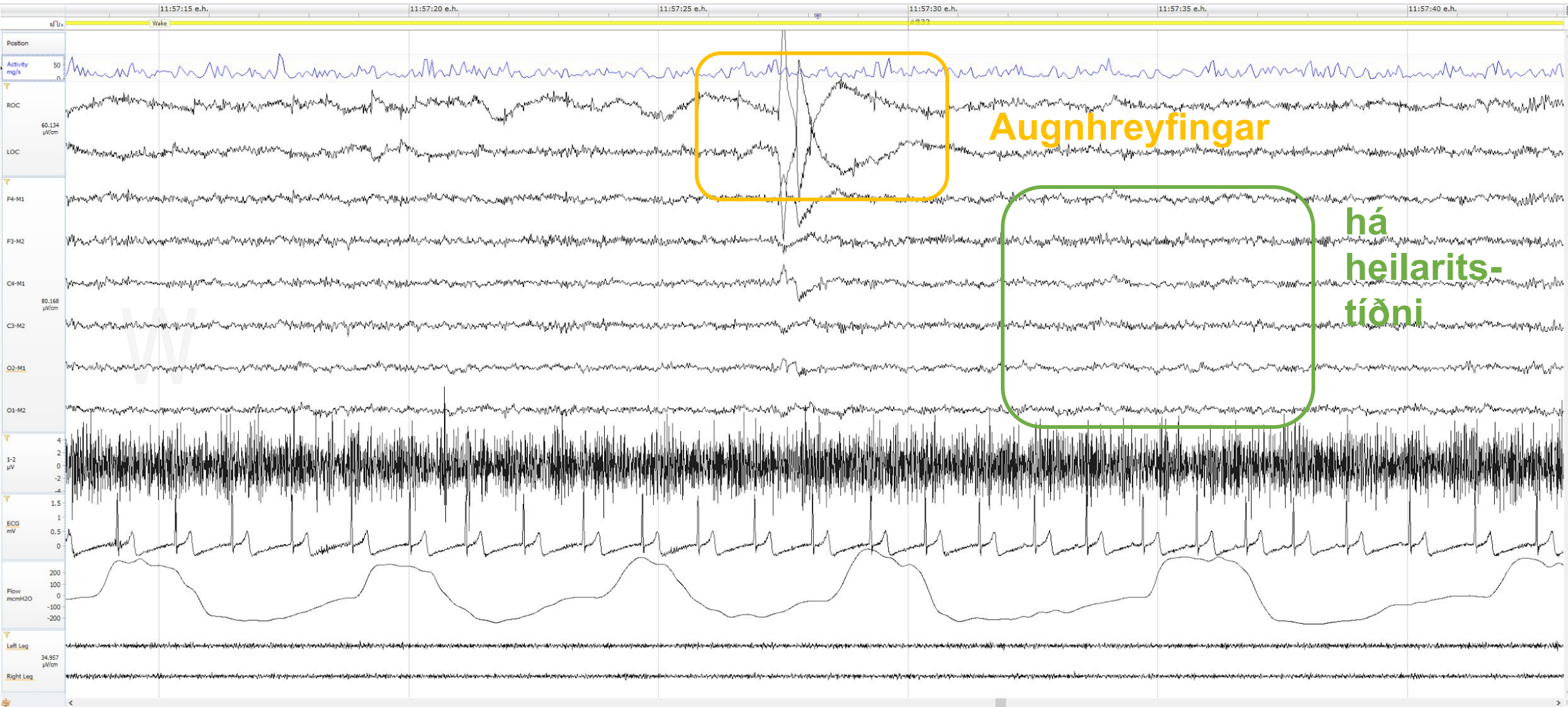


Svefn er mældur með heilariti

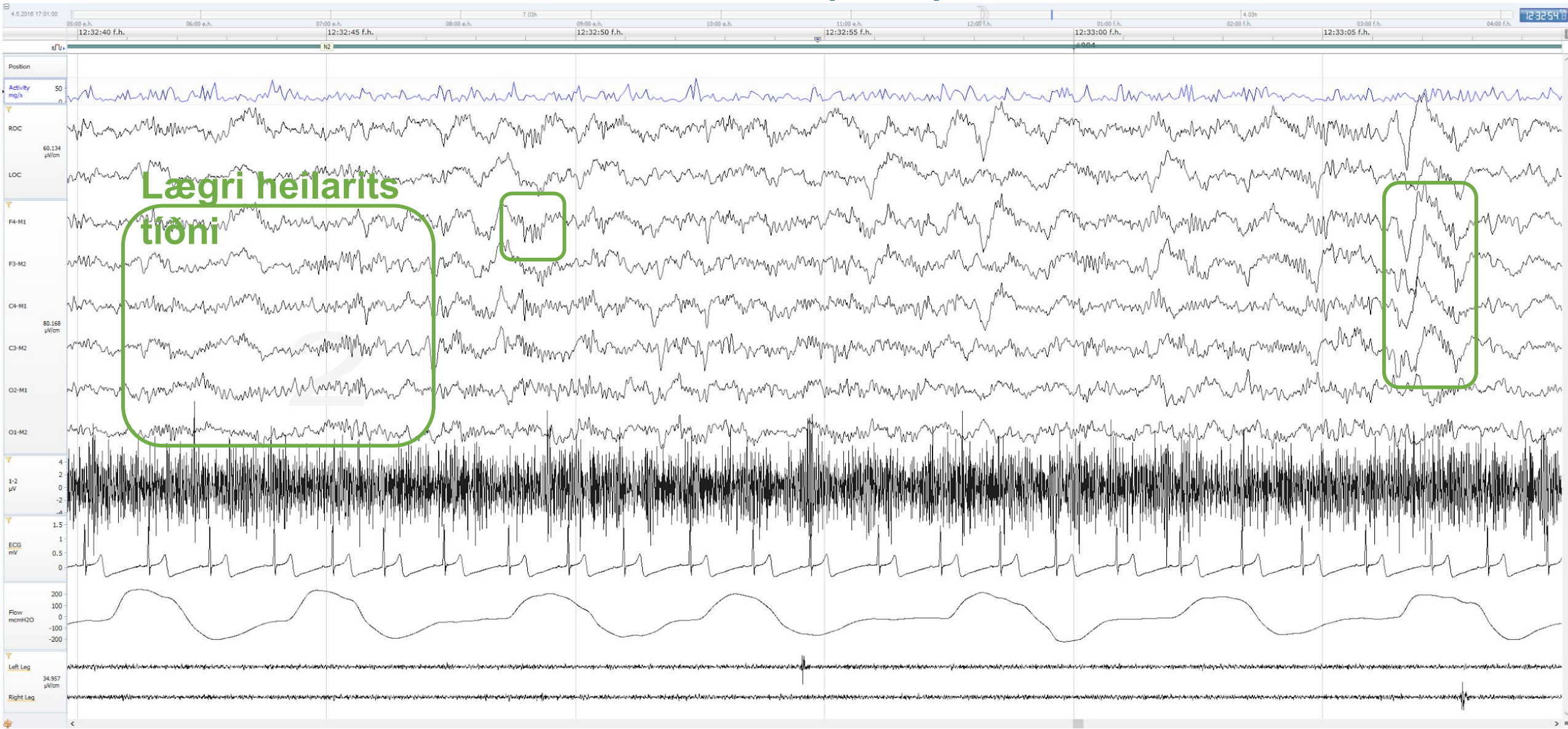
- Svefnstig
 - Þekkt mynstur heilavirkni sem endurtekur sig yfir nóttina



Vaka

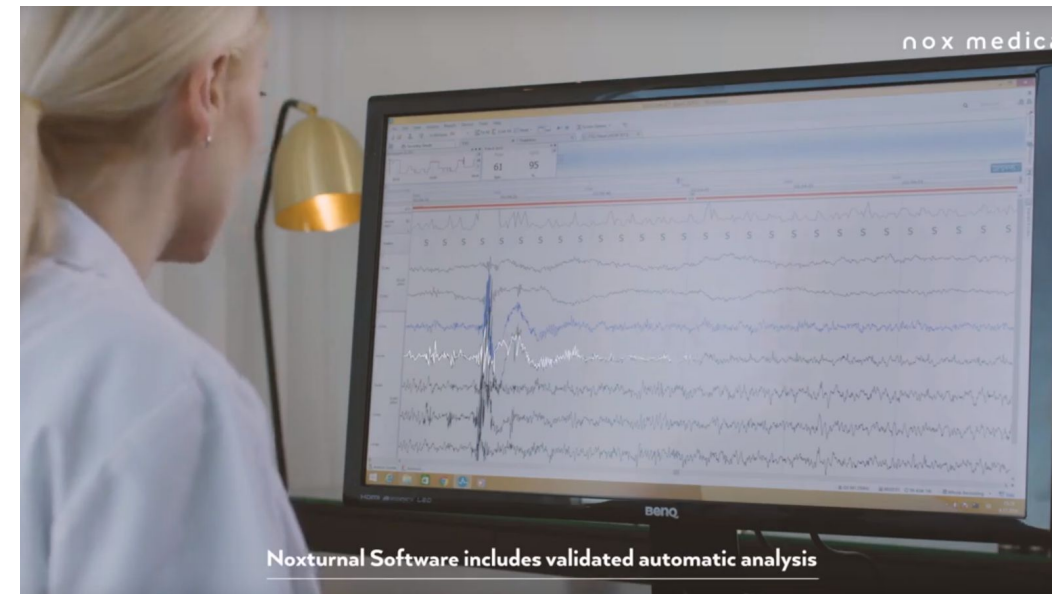


svefn (N2)



Svefnmæling og greining

- Merki sem eru mæld
 - heilarit
 - augnhreyfingar
 - öndun
 - súrefnismettun í blóði
 - vöðvatón
 - hjartarit
- Gögnin eru greind (skoruð)
handvirkt
 - **tekur 4 - 8 klst**



Nox Research

- Markmið
 - Sjálfvirknivæðing
 - Auðga svefnmæligögn
 - Rannsóknir
- Þverfaglegt teymi
 - Styrkt af samkeppnis-sjóðum
- Bæta greiningargetu lækna
- Bæta meðferð sjúklinga



European
Commission

Horizon 2020
European Union funding
for Research & Innovation



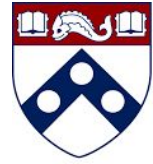
Tæknipróunarsjóður



eurostars™ dical



HARVARD
UNIVERSITY



Penn
UNIVERSITY of PENNSYLVANIA



BRIGHAM HEALTH



BRIGHAM AND
WOMEN'S HOSPITAL

BRIGHAM RESEARCH INSTITUTE



Stanford
University



LANDSPÍTALI
UNIVERSITY HOSPITAL



JOHNS HOPKINS
MEDICINE

THE JOHNS HOPKINS
HOSPITAL



THE UNIVERSITY OF
SYDNEY



THE UNIVERSITY OF
CHICAGO

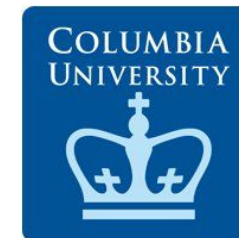
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deCODE  genetics



HÁSKÓLINN Í REYKJAVÍK
REYKJAVIK UNIVERSITY

REMOTE 
SmartECG

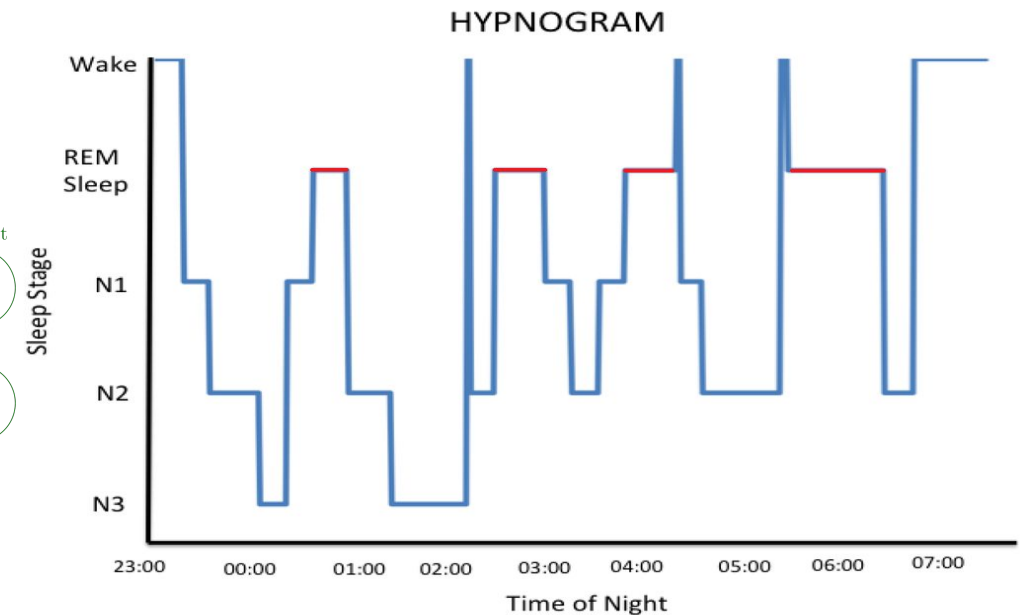
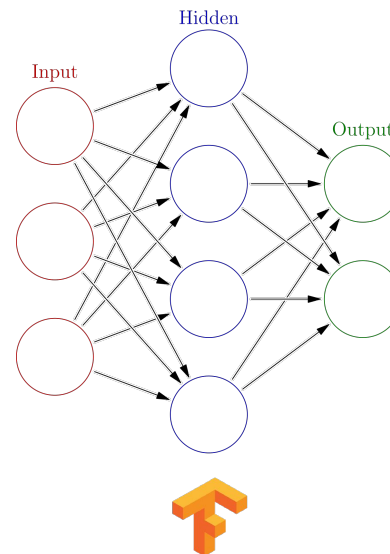
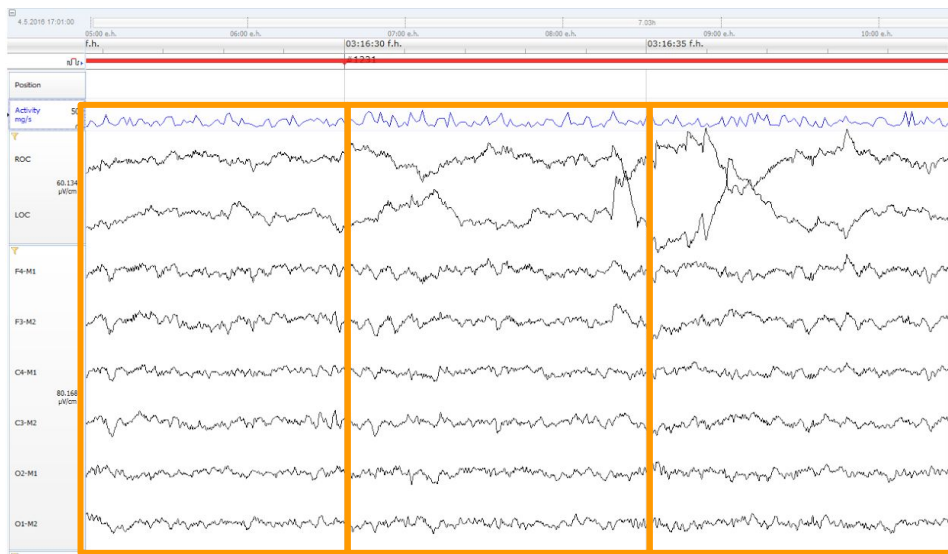


Imperial College
London

Sjálfvirknivæðing

Sjálfvirk svefnskorun

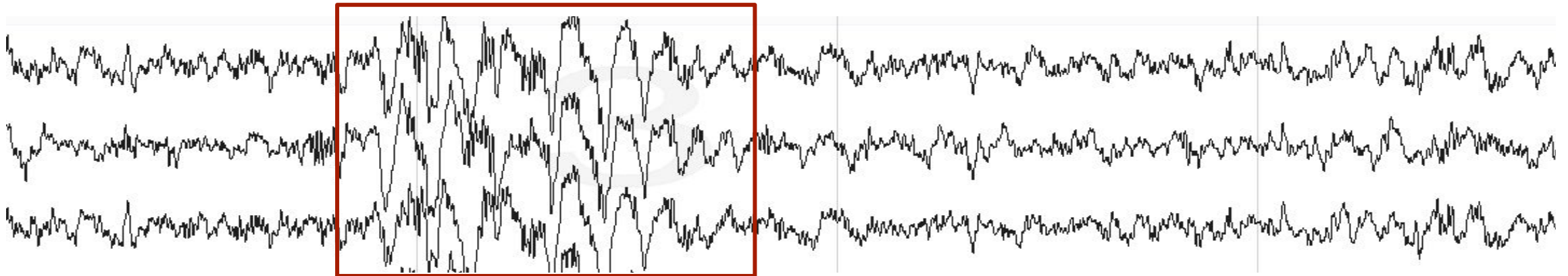
- Hverjar 30 sek flokkaðar í 1 af 5 flokkum
- Framflutningsnet (feed-forward neural netrowk)
- Greiningartími < 1 mínúta / mælingu (frá ~4 tímum)



Sjálfvirk örvökuskorun

- Erfitt að læra
 - Sjaldgæfir atburðir sem þarf að staðsetja í merkinu
 - Illa skilgreint markmið
 - Fólk er ekki mjög sammála um hvað örvaka er

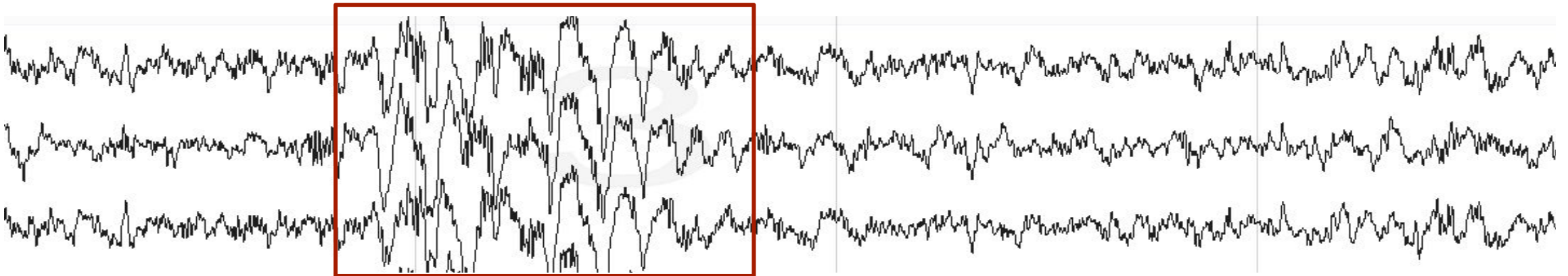
handvirkt merkt



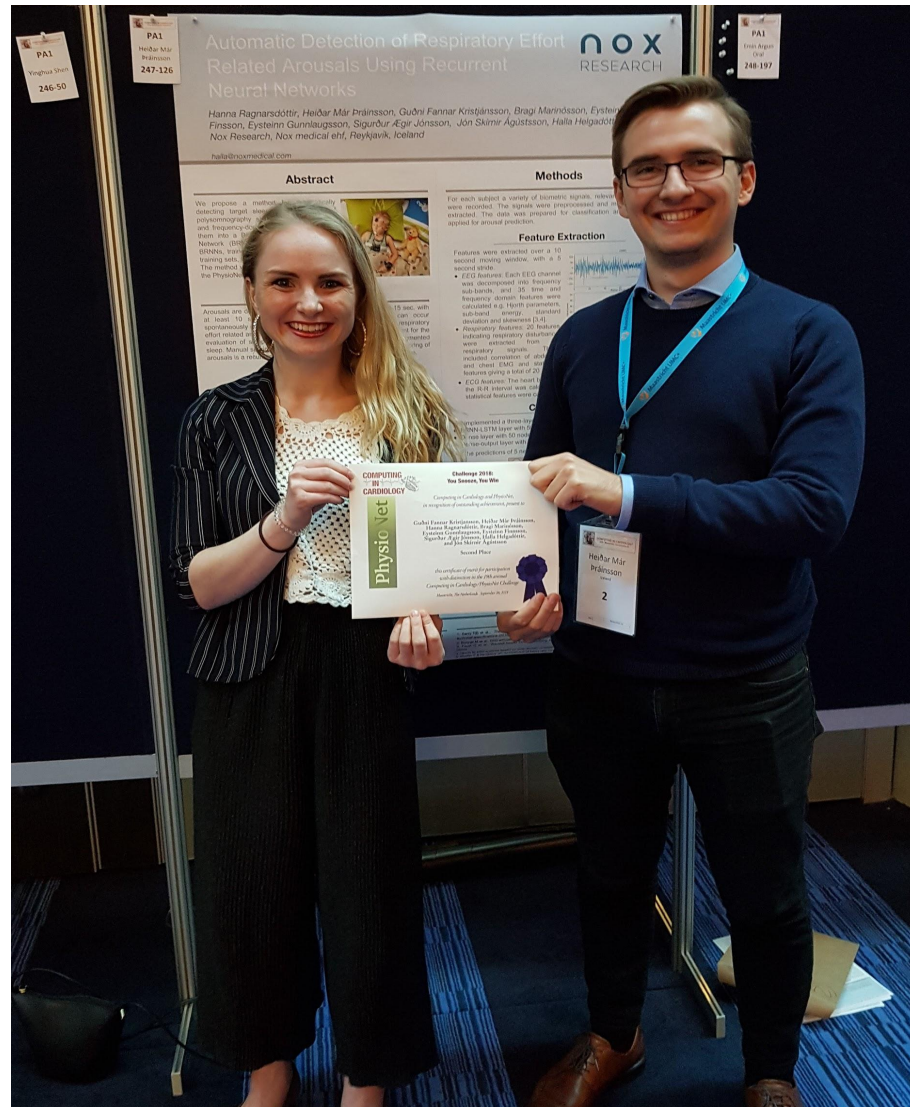
örvaka

Sjálfvirk örvökuskorun

- Endurtæk tauganet (recurrent neural network)
- Samhengið skiptir máli
- Mikið notað í máltækni
 - keyword detection: “Hey Siri”, “Ok Google”

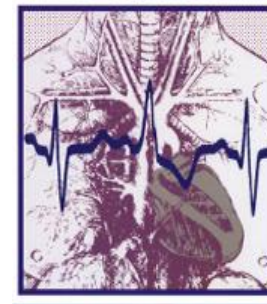


Annað sæti í PhysioNet keppninni 2018

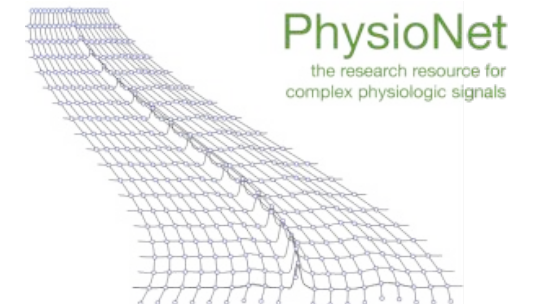


Rank	Entrant	AUPRC
1	Howe-Patterson, Pourbabaei & Benard	0.54
2	Kristjánsson, Þráinsson, Ragnarsdóttir, Marinósson, Gunnlaugsson, Finnsson, Jónsson, Helgadóttir, & Ágústsson	0.45
3	He, Wang, Liu, Zhao, Yuan, Li, & Zhang	0.43
4	Varga, Görög, & Hajas	0.42
5	Patane, Ghiasi, Scilingo, & Kwiatkowska	0.40
6	Miller, Ward, & Bambos	0.36
6	Warrick & Homsí	0.36
8	Bhattacharjee, Das, Choudhury, & Banerjee	0.29
8	Szalma, Bánhalmi, & Bilicki	0.29
10	Parvaneh, Rubin, Samadani, Prakash, & Katuwal	0.21

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RESEARCH



**COMPUTING
IN
CARDIOLOGY**



PhysioNet
the research resource for
complex physiologic signals

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Nýsköpunarverðlaun forseta Íslands



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Rannsóknir

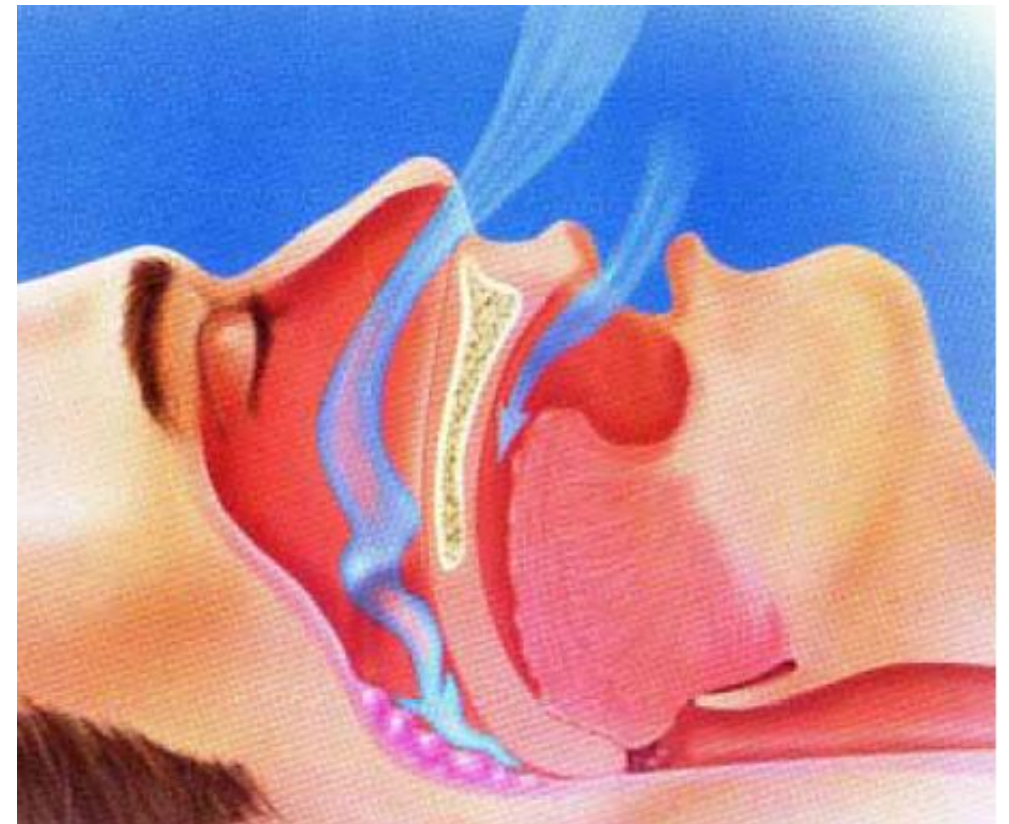
Kerfislíkön og gagnanám

Kæfisvefn er



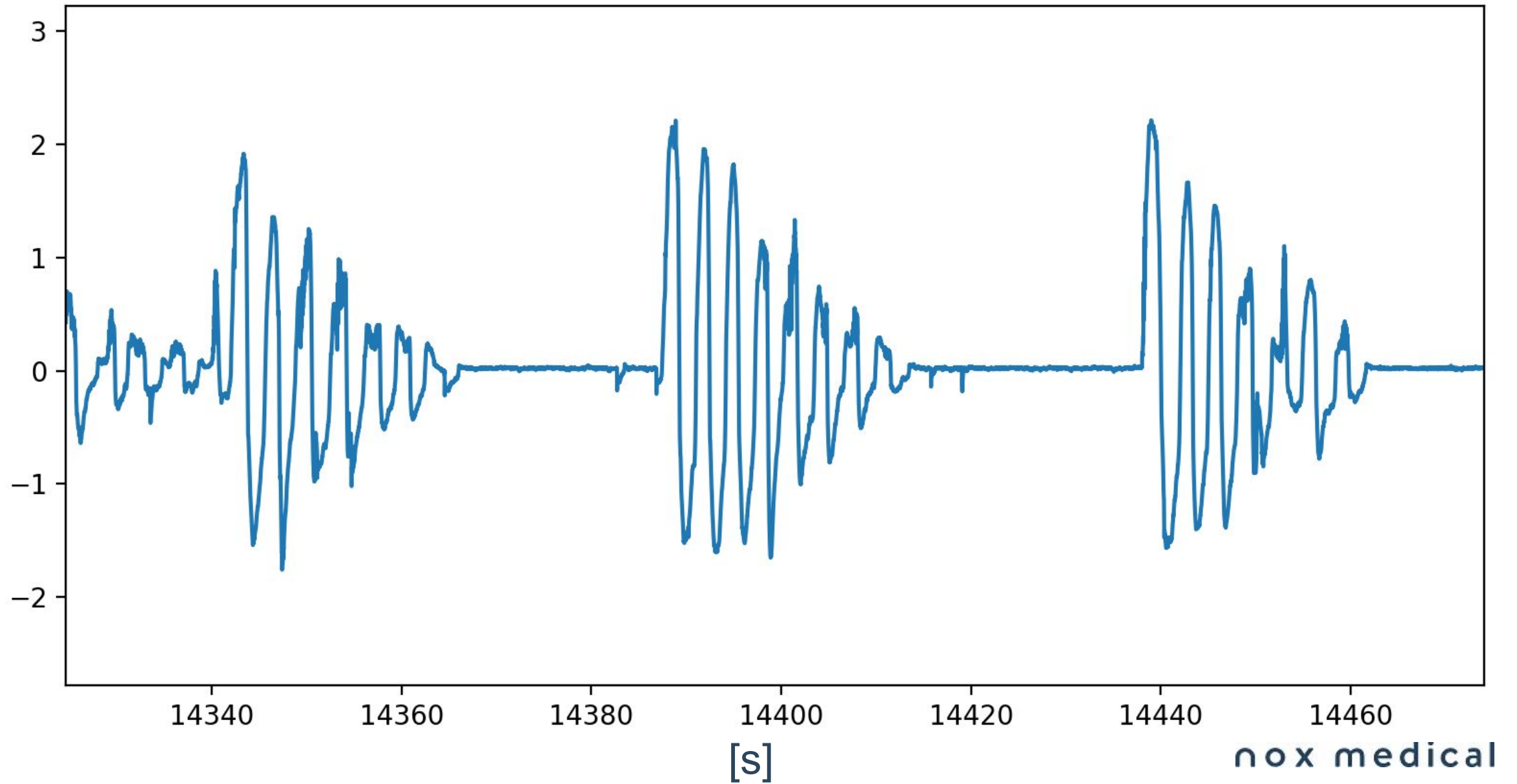
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- Endutekin öndunarhlé í svefni
- Undirliggjandi Orsakir
 - loop gain
 - upper airway collapsability
 - arousal threshold
 - upper airway gain
- Til að greina þeirra á milli þarf að mæla öndun **og** álag á öndunarkerfið (öndunnarerfiði)

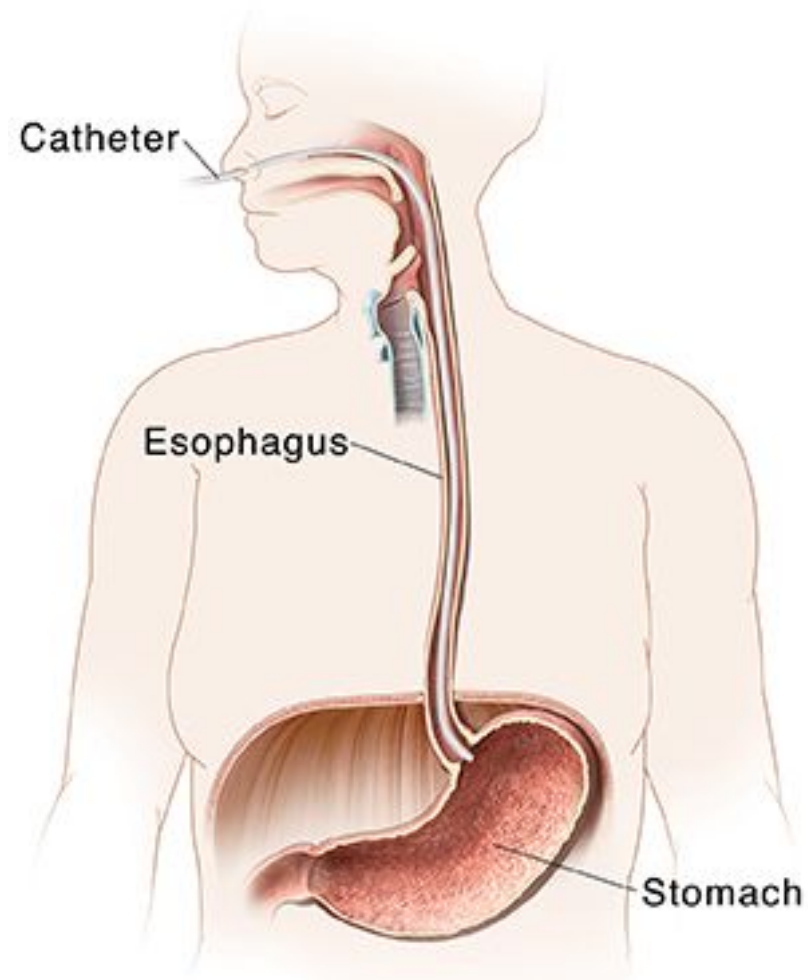


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Öndunarmarki



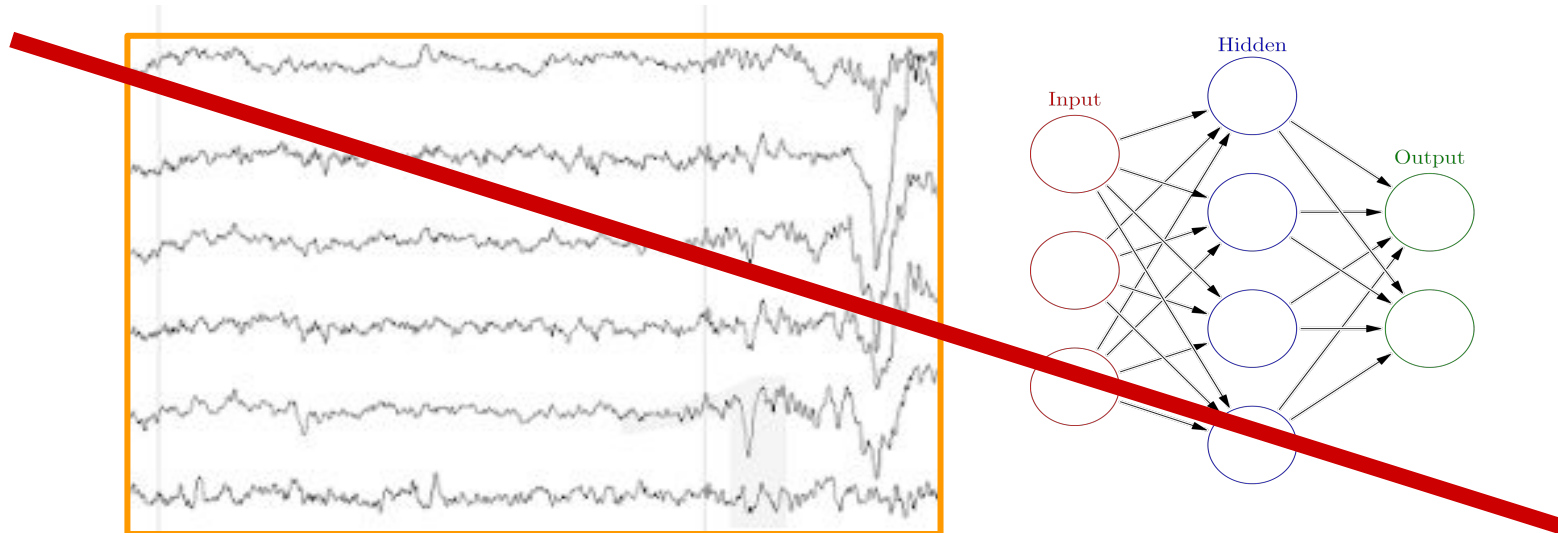
Mælingar öndunarerfiði



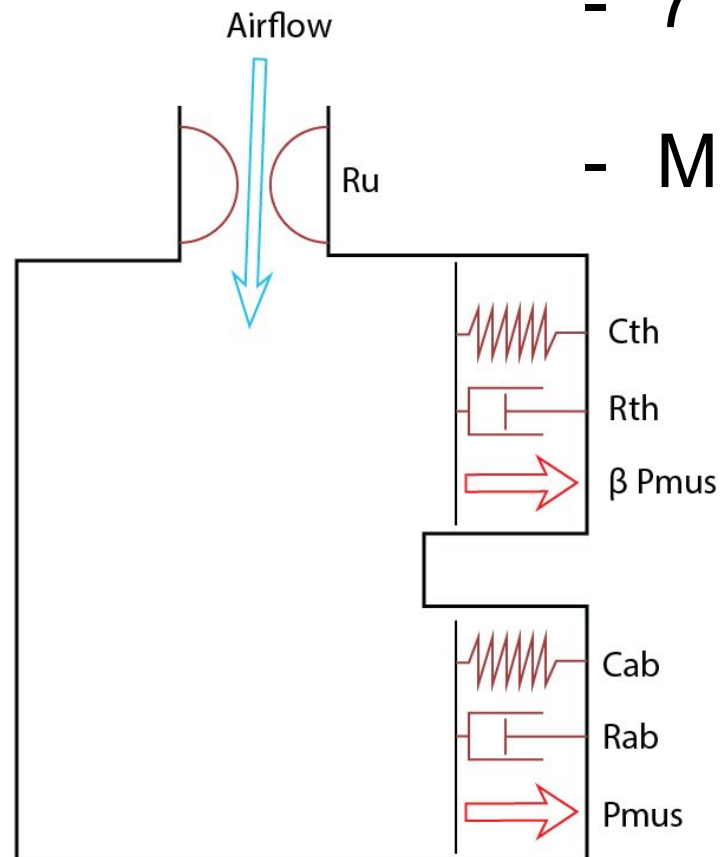
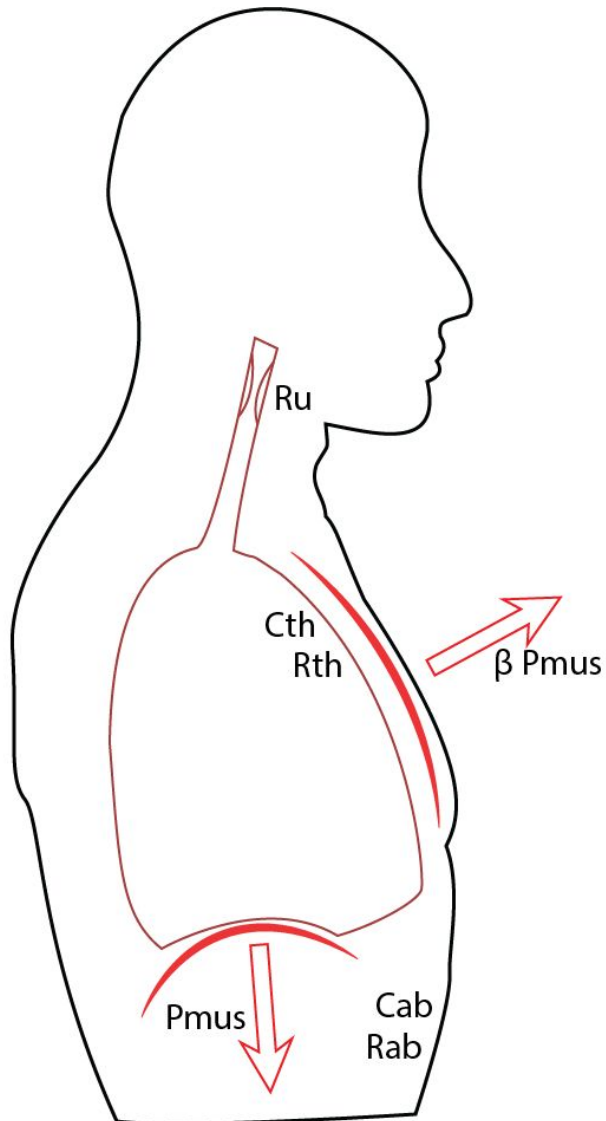
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Af hverju ekki tauganet?

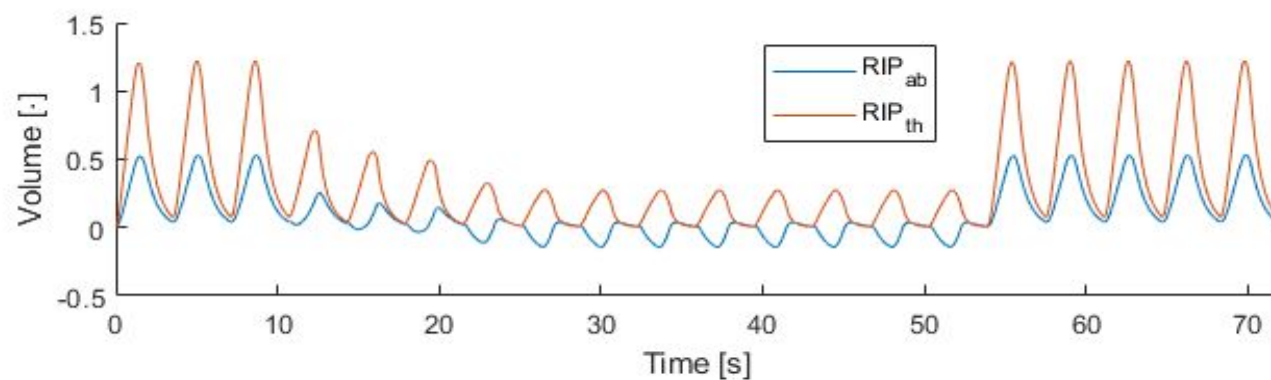
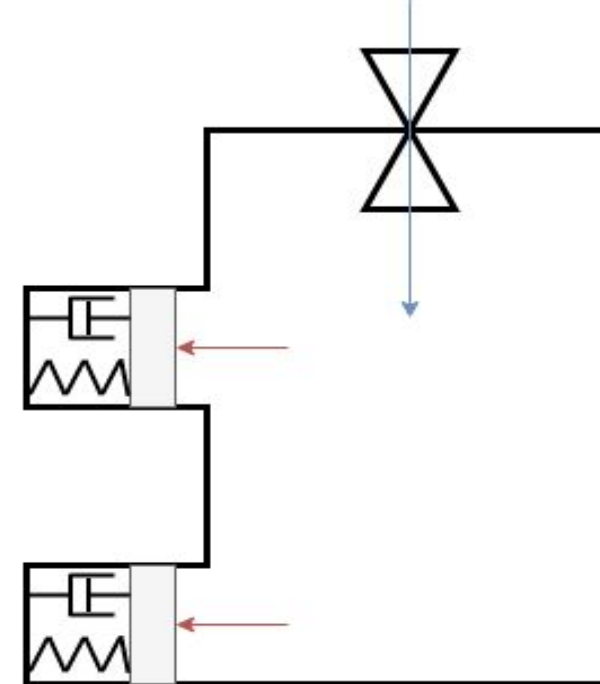
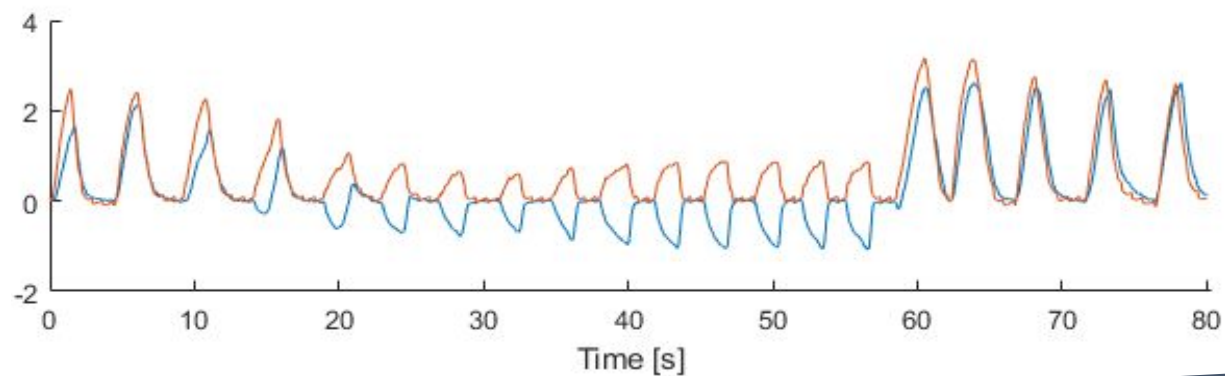
- Tauganet þurfa ógrynni af gögnum til að virka vel
- Fleiri þúsundir breyta sem þarf að besta
- Erfitt að komast yfir nóg af öndunnarerfiðis gögnum

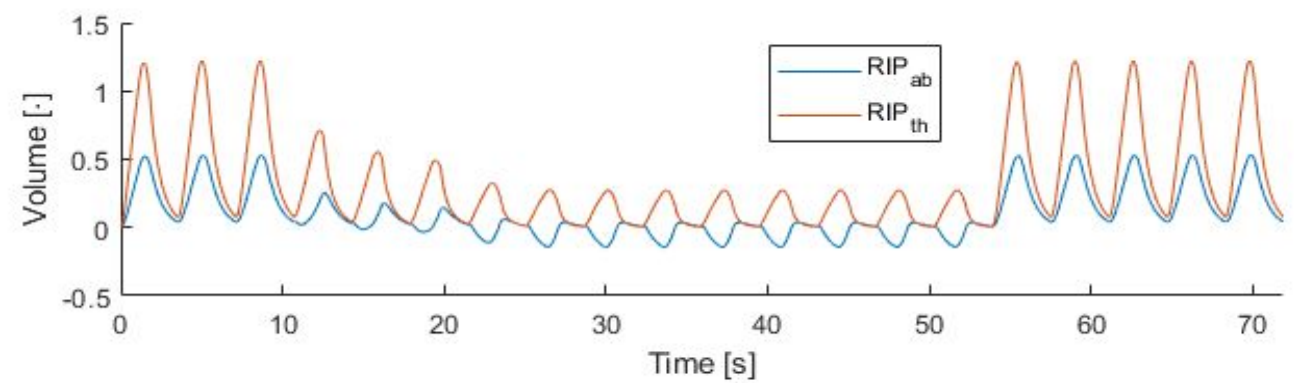
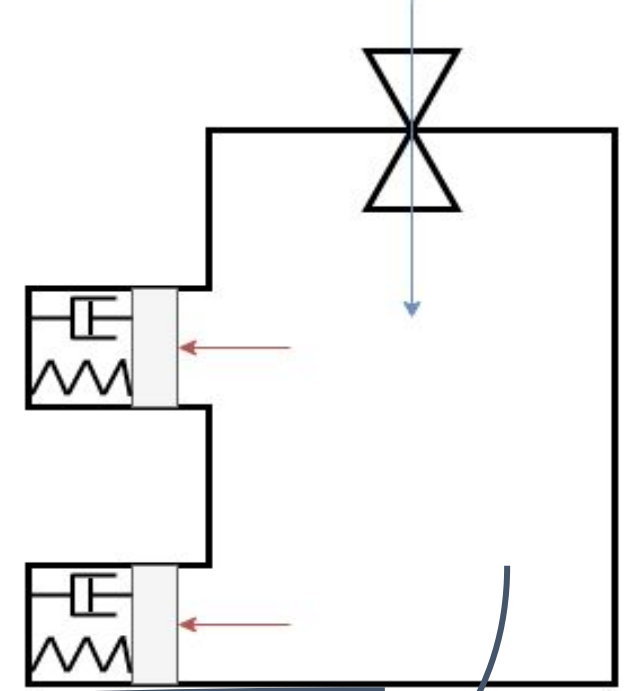
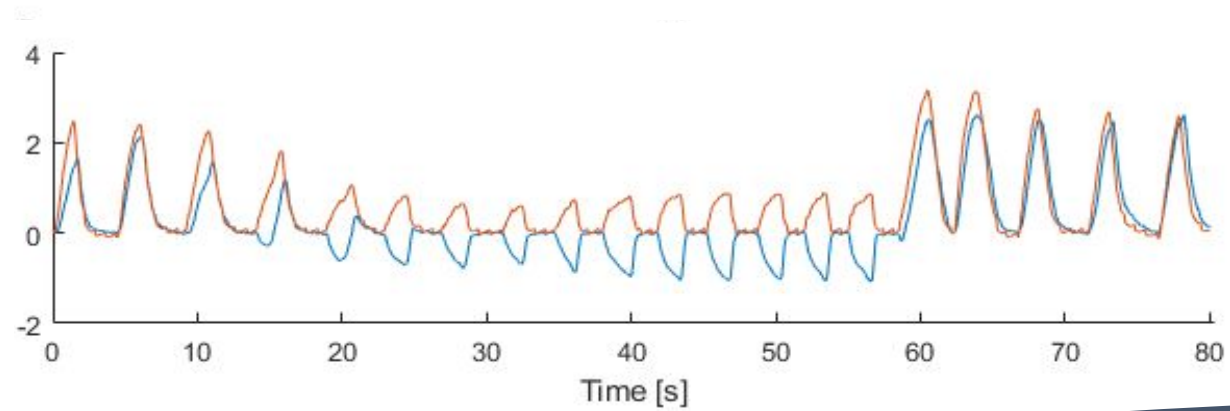


Skorður á líkanið



- Einfalt líkan sem lýsir lífeðlisfræðilegri hegðun
- 7 frjálsar breytur
- Minna lausnamengi





**Þrýstingur
í brjósthóli**

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Veganesti

- Ekki nóg að henda bara gervigreind í vandamálið
- Skilja fræðisviðið
- Skilja gögnin
- Skilja tólin

