How to Improve Glucose Biosensors:

A Modelling and Simulation Approach

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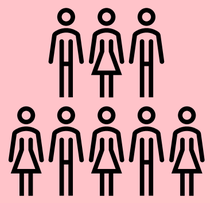
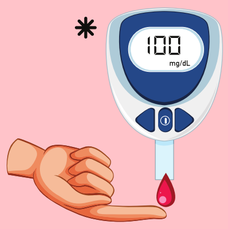
Overview



425 Million Diabetics[1]

629 Million by 2045[1]

Ocular, Cardiac and Nervous Damage Among Others



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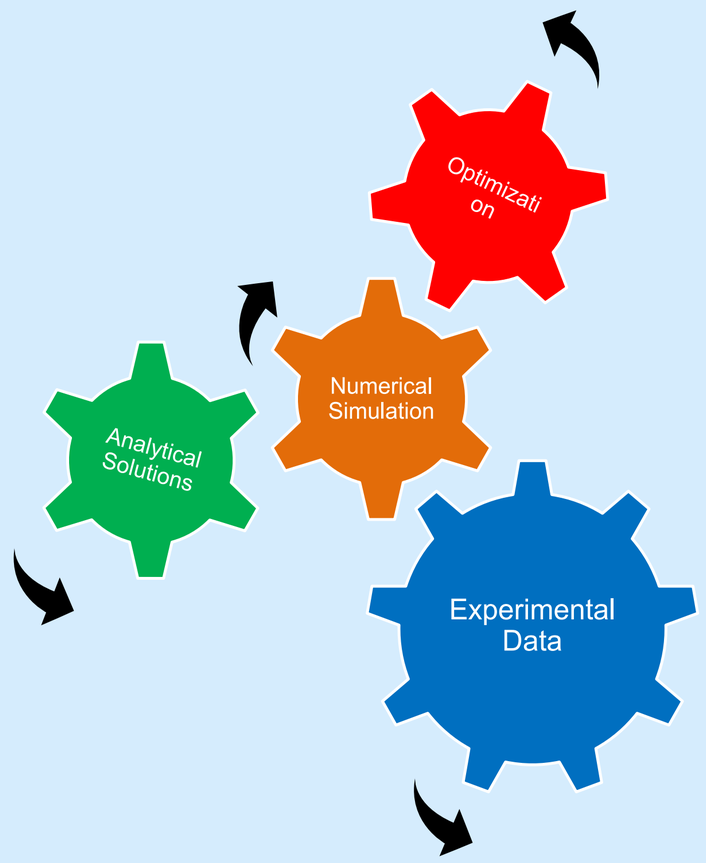
Sensor Solutions can be Improved by making them

- Faster
- Cost Effective
- Painless
- Continuous

Experimental data generated within **ImplantSens** are being used to **optimize biosensors** using **verified numerical simulations**



Design Goals

Response Time

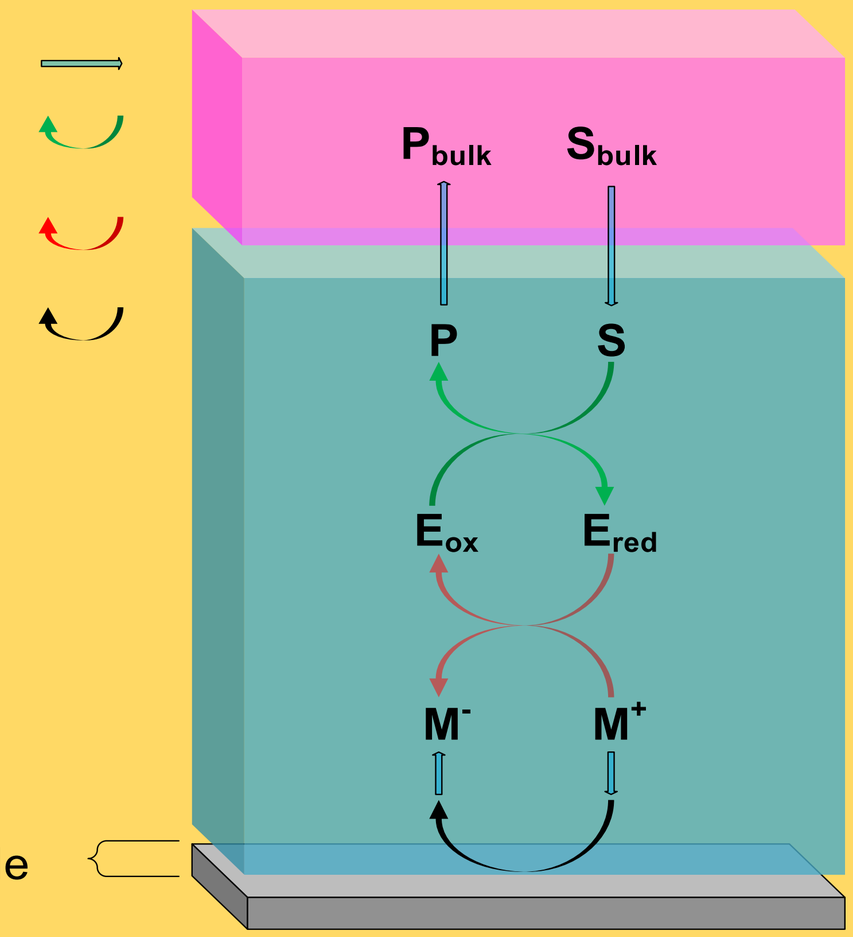
Sensitivity

Manufacturability

Range of Response

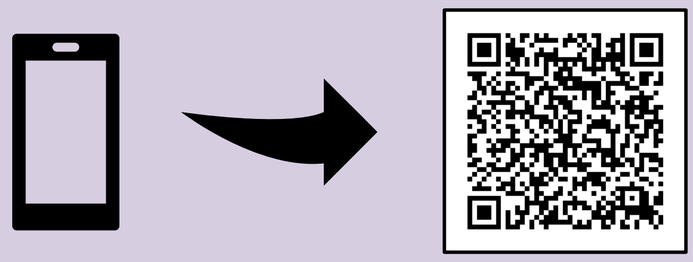
Progress So Far

1. Verification of the numerical output has been carried out using steady state analytical solutions of the mathematical model.
2. Pulsed sequences have been added onto the verified numerical simulation.
3. Numerical results will be further validated using novel validation methods involving manipulation of enzyme kinetic parameters.
4. We are also working towards simulations of enzymatic fuel cells used to power e-ink displays.



Video Demo

Following video demo shows the 1-D simulation for given experimental parameters.



References

[1] D. K. Mukaz, M. K. Melby, M. A. Papas, K. Setiloane, N. A. Nmezi, and Y. Commodore-Mensah, Ethnicity & Health, 2022, 27, 770–780.

ImplantSens has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No. 813006.

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*Vector art downloaded from www.vecteezy.com