Morné van Wyk

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Education

- **Ph.D. Biochemistry** — Stellenbosch, South Africa
  University of Stellenbosch — *Expected Mar 2024*
  Research project: *A study of β-pancreatic cell synchronization and metabolism modelling.*

- **M.Sc. Biochemistry - *cum laude*** — Stellenbosch, South Africa
  University of Stellenbosch — *Jan 2017 - Mar 2019*
  Research project: *The effect of adenylate kinase on the glycolytic oscillations of Saccharomyces cerevisiae*

- **B.Sc. (Honours) Biochemistry** — Stellenbosch, South Africa
  University of Stellenbosch — *Jan 2016 - Dec 2016*
  Courses: *Antimicrobial proteins, Practical biochemistry, Systems biology, Cytochrome P450, Steroid hormones*

- **B.Sc. Molecular Biology and Biotechnology** — Stellenbosch, South Africa
  University of Stellenbosch — *Jan 2013 - Dec 2015*
  Majors: *Biochemistry, Microbiology*

Certificates

- **Data Structures and Design Patterns for Game Developers** — Coursera
  University of Colorado — *May 2022*
- **C♯ Programming for Unity Game Development** — Coursera
  University of Colorado — *May 2022*
- **Python 3 Programming** — Coursera
  University of Michigan — *Jan 2022*

Research Experience

- **Visiting researcher** 10/2021 - 10/2022
  University of Gothenburg, Dept. Physics - Gothenburg, Sweden
  - Lead novel research in β-pancreatic cell biochemsitry, spearheading collaboration between 2 principle investigators.
  - Used fluorescent microscopy to investigate calcium oscillations in β-pancretaic cells.
  - Built and applied microfluidic devices for live-cell experiments.
  - Engineered code in Mathematica® for image processing, cell detection and data analysis.
  - Microfluidic device modelling in COMSOL Multiphysics®.
- **Ph.D. candidate** 03/2019 - present
  Stellenbosch University, Dept. Biochemistry - Stellenbosch, South Africa
  - Cultured and maintained β-pancratic cells for experimentation
  - Applied NADH-linked enzyme assays and spectrophotometry to characterize the kinetics of all glycolytic enzymes for the β-pancreatic cell line INS-1 831/13.
  - Constructed and validated a detailed kinetic model of glycolysis in β-pancreatic cells.
  - Performed detailed data and model analysis using Mathematica®
  - Supervised Master's students in advanced research techniques and data analysis.
- **M.Sc. student** 01/2017 - 03/2019
  Stellenbosch University - Cape Town, South Africa
  - Cultured yeast cells and prepared yeast cell-free extracts for experiments
  - Examined glycolytic oscillations in yeast cell-free extracts using fluorescence spectroscopy
  - Performed perturbation experiments to investigate fundamental questions on the nature of glycolytic oscillations
  - Conducted extensive data analysis using Mathematica®.
- **Course Tutor** 01/2017 - current
  Stellenbosch University - Stellenbosch, South Africa
  - Assisted with teaching students about the following topics: biomolecule structure-function and relationships, intermediary metabolism and systems biology (thermodynamics, enzyme kinetics, membrane transport, coupled-reaction systems, metabolic control analysis, metabolic regulation, mathematical modelling)

Skills

- **Wet lab:** Fluorescence microscopy, spectroscopy, cell culture, NADH-linked assays
- **Dry lab:** Mathematical modelling, data analysis, image processing, signal analysis
- **Programming:** Mathematica®, Python, LaTeX
- **Game Development** Unity, C♯, animation, GLSL

Publications

- van Wyk, Morne. *The Effect of Adenylate Kinase on the Glycolytic Oscillations of Saccharomyces Cerevisiae.* Stellenbosch: Stellenbosch University, 2019.

Projects

- **CappyStack** not yet released
  Stack tangerines on the head of a Cappybara. *Mar 2023*
  Skills: *Made use of fundamental game design patterns, 3D physics and 3D modelling.*
- **Asteroid-Like** published to itch.io
  A small game based on the classic Asteroids game playble in browser. *May 2022*
  Skills: *Made use of design patterns such as object pooling, prototyping and command patterns. Gained experience in coding shaders using GLSL.*
- **Castle Climber** published to itch.io
  The player jumps their way up a castle avoiding the traps and collecting rubies. *Sep 2021*
  Skills: *Gained experience in 2D level design, 2D art and animation.*
- **Asteroid Belt** published to Google Play
  Pilot a spaceship through an asteroid belt using gyroscopic controls. *Sep 2021*
  Skills: *Gained experience in Android game development, tapping into mobile hardware such as gyroscopes and accelerometers, implementing unlockables and implementing mobile adverts.*
- **Paddle Ball** published to Google Play
  The player must use their reflexes to keep a ball bouncing on a paddle. *Sep 2021*
  Skills: *Became experienced in Android game development, 2D physics and mobile advert integration.*