



Division of Clinical Pharmacology Postdoctoral Fellowship in Pharmacometrics

The Division of Clinical Pharmacology at the University of Cape Town invites applications for a **Postdoctoral Research Fellowship**. Highly motivated science/engineering/data science researchers are invited to contribute to the research and training activities of the **Pharmacometrics Group**.

Pharmacometrics is an emerging discipline that uses mathematical and statistical tools to quantify drug, disease, and trial information to aid efficient drug development and/or regulatory decisions. It designs and applies mathematical models to describe the relationship between drug exposure (pharmacokinetics) and response (pharmacodynamics) for both desired and undesired effects, and aims to include in such models the effects of individual patient characteristics.

Our Pharmacometrics Group has established **pharmacokinetic/pharmacodynamic** expertise in the area of **tuberculosis, HIV, and malaria**. It is active internationally and enjoys on-going collaborations and exchange programs with some of the most renowned pharmacometric modelling groups worldwide.

This fellowship is not only a unique chance to acquire an internationally sought-after set of professional skills geared towards a career either in academia or the pharmaceutical industry, but also an opportunity for a scientist in quantitative sciences to apply their expertise within the fascinating and rewarding framework of biomedical research.

Conditions of Award:

- Eligible candidates will have obtained the **PhD degree** in pharmacometrics, applied mathematics, engineering, (bio-)statistics, pharmacy/pharmaceutical sciences, or a closely related discipline **within the past 5 years**.
- Candidates who are in the final stage of their PhD are also encouraged to apply.
- The fellowship involves advanced mathematical/statistical/computer modelling and simulation. **Strong quantitative skills** and experience with **computer programming** (e.g. R, Matlab, C++) and **data analysis** are required.
- Previous experience in pharmacometrics and pharmacology is highly desirable.
- The post-doctoral fellow will be required to contribute to pharmacometric research activity of the division:
 - The research projects can be adjusted to the interests and skills of the candidate and will pertain to the research interests of the division, mostly (but not only) the pharmacokinetics and pharmacodynamics of drugs for infectious diseases, with a focus on drug-drug interactions and dose optimization for neglected populations, such as paediatrics and pregnant women.
 - Candidates who are interested in pursuing more methodological topics (but relevant to the clinical interests of the division) will be encouraged to do so.
- As part of the candidate's professional development, limited mentorship and training of students will be required.

- A good command of English, passion about scientific research, and the ability to work within a team are essential.
- The successful candidate will be required to comply with the University of Cape Town's approved policies, procedures and practises for the postdoctoral sector. <http://www.uct.ac.za/main/research/postdoc-research-fellowships>

Scholarship:

A competitive scholarship is offered to the post-doctoral scholar, which is tax-free, and tenable for 1 to 3 years renewed annually, conditioned on satisfactory academic progress and availability of funds.

Application Requirements:

Suitable candidates are required to submit the following:

- A letter of interest/introduction (max 1 page) in which the candidate motivates why s/he is suitable for the award of the fellowship;
- A CV including details of conferences presentations and all publications;
- The names and email addresses of at least three academics who have agreed to stand as referees on behalf of the applicant
- Certified copies of academic transcripts (these can be sent later, if the candidate's application is successful)

Please fill in the following form <https://forms.office.com/r/HvViRH92f> All enquiries must be submitted to pharmacometrics@uct.ac.za. Applicants for this call must submit their documentation by April 15th 2022, but enquiries regarding further future positions are welcome.

Selection Process:

Eligible and complete applications will be considered by a committee chaired by the head of Division of Clinical Pharmacology, University of Cape Town.

The University of Cape Town reserves the right to make no awards at all, to cancel the award if the conditions are not met, and to effect changes to the conditions of the award. The University of Cape Town reserves the right to disqualify ineligible, incomplete and/or inappropriate applications.

The image shows a collage of pharmaceutical-related content. On the left, there is a photograph of a pile of multi-colored pills and capsules. A large blue arrow points from this image towards a compartmental pharmacokinetic model diagram on the right. The diagram consists of two circular compartments, labeled 1 and 2. An external input 'ex1' is shown entering compartment 1. Bidirectional arrows between compartments 1 and 2 are labeled with rate constants k(2,1) and k(1,2). A downward arrow from compartment 1 is labeled k(0,1). Below the diagram, a set of differential equations is presented, labeled (A):

$$\begin{aligned} \frac{dA_1(t)}{dt} &= -\frac{CL_{NON}}{V_{CY}} A_1(t) - \frac{CL_{IND}}{V_{CY}} A_1(t) A_2(t) \\ \frac{dA_2(t)}{dt} &= K_{ENZ} \left(1 + \frac{E_{MAX}}{E_{50} + \frac{A_1(t)}{V_{CY}}} \right) - K_{ENZ} \cdot k(2,1) q_1(t) + k(1,2) q_2(t) + ex1 \\ \frac{dA_3(t)}{dt} &= \frac{CL_{IND}}{V_{CY}} A_1(t) A_2(t) - K_{ICY} \cdot A_3(t) - K_{34} \cdot A_3(t) \\ \frac{dA_4(t)}{dt} &= K_{34} \cdot A_3(t) - K_{CEPM} \cdot A_4(t) \end{aligned} \quad (A)$$