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The Admission Committee
Paul Painlevé Laboratory
University of Lille
Villeneuve-d'Ascq, France

Dear Members of the Admission Committee,

I am writing to express my interest and intent to apply for the doctoral position in Mathematical Modelling of the Effect of Senescence in Cancer Progression at the Paul Painlevé Laboratory of the University of Lille. I was pleased to learn about this offer through Professor Sophie Dabo, who not only taught me in my Master's program at AIMS South Africa but has mentored me during my Master's essay on Functional Data Analysis. Professor Sophie's guidance and readiness to help was instrumental in my academic development, and his recommendation to explore this specific doctoral program underlines the alignment between the program's focus and my research interests.

With a Master's degree in Applied Mathematics and a profound commitment to advancing cancer research through mathematical models, I am eager to contribute to and expand the innovative research facilitated by your prestigious institution.

The unique focus of this thesis on modeling the induction and escape of senescence during cancer cell chemotherapy treatment immediately captured my interest. Understanding the phenotypic changes in cancer cells and the surrounding tumor environment that can lead to disease relapse is crucial for developing effective treatments. The goal to model these cellular processes at a spatial scale, considering treatment dose variations and their resulting cellular heterogeneity, presents a challenging yet exciting opportunity to deepen our understanding of cancer biology through mathematics.

The interdisciplinary environment at the Paul Painlevé Laboratory, as well as the collaboration with Oncolille, offers an ideal setting for this kind of innovative and impactful research. The integration of differential equations modeling and spatial-temporal evolution analysis with statistical analysis of experimental data from CANTHER, particularly in organoid models, aligns

perfectly with my academic background and research interests. My experience in using statistical tools and programming languages such as Python and R to solve complex biological problems will be instrumental in contributing to and advancing the project's goals.

Moreover, the opportunity to work under the guidance of esteemed professors like Prof. Vanessa Dehennaut, and to engage with the multidisciplinary teams across Oncolille, is incredibly appealing. I am particularly interested in exploring how senescence can be induced and modulated to prevent cancer relapse, using both established and novel mathematical approaches. This aligns with my career goal to become a researcher who bridges the gap between mathematical theory and clinical applications in oncology.

I am enthusiastic about the possibility of contributing to your team and am eager to bring my background in applied mathematics and passion for cancer research to the University of Lille. I am confident that my proactive approach and unyielding dedication to research will allow me to make a significant contribution to the project and the broader scientific community.

Thank you for considering my application. I am looking forward to the opportunity to discuss my application in further detail.

Yours sincerely,
Jeremie Nlandu Mabiala