December 3, 2023

To whom it may concern,

I am writing to express my sincere interest in a Ph.D. position at ISTA. My name is Víctor Ballester, and I am currently enrolled in the M2 Applied and Theoretical Mathematics program at Paris-Dauphine University, following my graduation from Mathematics at the Autonomous University of Barcelona last summer. I am particularly attracted to the field of Applied Mathematics, with a specific focus on computational PDEs, numerical analysis, and recently, fluid dynamics.

The area of fluid dynamics, particularly Aerodynamics, has captured my attention due to its theoretical and numerical complexities. I aspire to contribute to research in this field, exploring both the theoretical foundations and numerical methods. This motivation is one of the primary reasons for my application to a Ph.D. position at ISTA.

There are two key reasons why I am seeking admission to this Ph.D. program. Firstly, my undergraduate and current graduate studies have equipped me with a strong foundation in analysis, numerical methods and the theory of differential equations. Courses such as Differential Equations and Modelling (I and II), Numerical Methods, and Partial Differential Equations have provided me with the necessary tools to tackle complex applied problems across various scientific disciplines. Moreover, in my master studies, I have been able to delve deeper into fluid dynamics and turbulence, which is something I would like to continue exploring in my Ph.D. studies. I find the intersection of Mathematics with Physics and Engineering to be highly intriguing, as it allows for rigorous exploration while addressing practical challenges.

Secondly, the opportunity to study at such an esteemed institution, alongside renowned professors, presents an exciting challenge. As someone who has always aspired to conduct research at a high level in a foreign country, this opportunity fills me with motivation and enthusiasm. Additionally, the experience of living and studying abroad is immensely enriching from a cultural perspective. Therefore, I eagerly look forward to the prospect of relocating to Austria for the duration of my studies.

Regarding my academic performance in Mathematics, I have consistently strived for improvement throughout my university years. My dedication and competitiveness have driven me to excel in various aspects of my life, especially in Mathematics. The presence of talented classmates has further encouraged my personal growth in these subjects. Furthermore, my active participation in renowned Mathematics and Physics competitions each year underscores my genuine passion for these fields and the knowledge they impart. I believe this academic background positions me well to pursue advanced studies abroad.

My primary research groups of interest at ISTA are the *Nonlinear Dynamics and Turbulence* group, lead by Prof. Björn Hof, and the *Theory of Partial Differential Equations, Applied and Numerical Analysis* group, lead by Prof. Julian Fischer. Moreover, as the application form requires, I would like to spend my first year at ISTA also in the *Emergent Electronic Phenomena in 2D Materials* group, *Computational soft and living matter* group or the *Computational materials science* group, to gain a broader perspective on the field of computational physics.

In conclusion, being accepted into this Ph.D. program would enable me to deepen my understanding of Mathematics at ISTA. I am confident that this program will provide me with the necessary platform to expand my knowledge and contribute meaningfully to the academic community.

Thank you for considering my application.

Yours faithfully,

Víctor Ballester