ACCEPTANCE SPEECH AS DOCTOR HONORIS CAUSA BY THE UNIVERSITY OF BURGOS BY MR. FRED GLOVER

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Distinguished faculty,
Honored guest,
Esteemed colleagues at Universidad de Burgos,

I am deeply grateful to receive this honorary degree. The University of Burgos is not only a major modern university but has an awe-inspiring tradition dating back to the 13th century.

But I'm going to speak today about an inspiration to create a different type of tradition.

This degree, in honor of my contributions to the field of optimization, comes at time when we face critical challenges to apply optimization meaningfully in the modern world.

Today we are confronted with challenges that affect not only our welfare but our survival. Challenges from Climate change, Biodiversity, Healthcare, Economic insecurity and inequality, Threat of war and violence, Security, notably including Cybersecurity, and Artificial intelligence, among many others.

Optimization has a key role in all of these. To appreciate this relationship, I'm going to go back in time. Some of you who are old enough may recall that artificial intelligence sank into the doldrums in the mid to late 1970s, generally coming to be regarded as being of little value. At the same time, optimization was steadily gaining increased significance, especially the area of integer programming, also known as discrete optimization, for becoming the source of a wide range of practical applications.

Motivated by these developments, I published an article titled "Future Paths for Integer Programming and Links to Artificial Intelligence", which maintained that future innovations in discrete optimization and artificial intelligence were intimately linked.

The impact of the article greatly exceeded my expectations. Its primary theme held that the linkage between AI and optimization was mediated by the realm of advanced heuristics that went beyond the types of heuristics we had devised in the past. I emphasized that these

advanced types of heuristics could be compounded by incorporating other methods within them and called them "metaheuristics."

The name caught on, and today there are dozens of books about metaheuristics. National and international conferences appear annually on the topic, as well as sessions on metaheuristics in general conferences on optimization.

But another development came from this article, which was to introduce the Tabu Search method as an instance of a metaheuristic. Currently, "Tabu Search" returns over a million results on Google. Manuel Laguna, my coauthor on the book "Tabu Search," and Rafa Marti, our coauthor on many related publications, are here with us at this investiture today.

This interrelation between metaheuristic optimization and AI is additionally being pursued within the realm of quantum-related optimization – an area that researchers are actively investigating at IBM, Microsoft, Google, Amazon, and many others, including Entanglement, where my colleagues and I are based.

I am doubly grateful for this honor bestowed on me today, not only as a tribute to my past contributions, but also as a tribute to important new contributions by many researchers who have adopted the perspective that has motivated my work – contributions we need to bring optimization to bear on our pressing current challenges.

Thank you very much.