

Foreword by Robert S. Langer

It is an honor and a pleasure to write a foreword to *Empathic Entrepreneurial Engineers* by David Fernandez Rivas. This is a terrific book that combines case studies, interviews with entrepreneurs, and other relevant pedagogical tools. It is a book that should be very useful for teachers who will use it in both undergraduate and graduate programs. This book also makes a major effort to nurture empathy to everyone who reads it, though it is largely aimed at STEM students and professionals.

Empathy is considered as one of the durable skills that are needed to prepare the professionals who will face the challenges of the 21st century. Durable skills – so-called “soft” or “people-related” skills – are meant to balance the toolbox engineers and other professionals should have. These are particularly handy for interdisciplinary teamwork. Teaching durable skills and nurturing entrepreneurial character in students and professionals is a laudable challenge that not many educators or leaders tackle.

This book should serve as an innovation guide for both people new to innovation and experienced professionals. David gives the reader, through conversations and short interviews, a feel for what different engineers do and think and how their companies develop. The journey these innovators take should provide inspiration for your own journey.

David brings an interesting combination of elements that respond to his professional trajectory, which he shares in his book. He has shown an outstanding commitment to research that advances science and technology targeted at sustainable solutions to global societal challenges. His talent is in connecting fields and people as shown, for example, by the many co-authors of his published work in very broad subject areas ranging from physics, chemistry, chemical engineering, and materials, energy, and environmental sciences to bioengineering, education, and social sciences.

With his home base now at the University of Twente, The Netherlands, he has an excellent publication record, including research done in Cuba under difficult circumstances. He has had research visits at numerous top institutions, including the Massachusetts Institute of Technology (MIT), where he is Research Affiliate with the Mechanical Engineering Department, École Polytechnique Fédérale de Lausanne (EPFL), the University of Melbourne, Dortmund University, and the International Centre for Theoretical Physics in Trieste.

David was chosen as the Dutch Engineer of 2021 by the Royal Dutch Institute of Engineers, showcasing his devotion as scientist with an open eye for real-world applications. I find it remarkable to see how he balances excellent scientific research with well-planned and visible efforts to valorize it. He communicates enthusiastically with the public media and creates companies and products used in society.

After receiving his degree as a nuclear engineer, David has grown out to the larger length-scales of our physical world, adapting to new areas. His efforts align well with

sustainable development goals, such as Good Health and Well Being, Quality Education, and Clean Water and Sanitation. One of his ambitions that stands out due to the relevance and urgency it has today is the development of needle-free injections for biomedical applications such as vaccination or insulin treatment.

Finally, David has a quality that is especially vital these days: He is a good communicator. In this book, as in his regular work, he often uses art and humor to get his message across. He has innovated low-cost technologies that will help improve the quality of life in both developed and developing countries. Doing all this matches the title of his book *Empathic Entrepreneurial Engineering*. I think you will very much enjoy reading it.

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