



Editorial

Top Research In Malta

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Dear Xjenza Online Readers,

Following the success of the inaugural Special Issue on Top Research in Malta, we have decided to launch a new collection featuring researchers who were among the top 2% of the most cited authors globally in 2021. We were pleasantly surprised to see the inclusion of young colleagues alongside the distinguished scholars from the previous edition. The 2021 top 2% list was published by Stanford University and Elsevier and is available at <https://elsevier.digitalcommonsdata.com/datasets/btchxktzyw/4>.

In fact, in 2021, we had twenty scientists based in Malta – twelve of whom are affiliated with the University of Malta.

This list of the most widely cited researchers in their fields was compiled by Prof. John Ioannidis and his team at Stanford University. They analyzed data from 1965 to 2020, covering around 7 million scientists in 22 major fields. The list identifies the top 100,000 scientists across all fields and was published in *PLOS Biology* in 2022 (Ioannidis, 2022).

To provide a broader snapshot of the best science in Malta, we invited not only the 22 researchers included in Ioannidis' list but also those listed among the top ones in Google Scholar User Profile rankings when you search for the University of Malta (Google Scholar, 2024), where scholars are listed according to the number of their citations.

Readers will find 11 invited articles in this second part of the Special Issue, with others scheduled for future editions on Top Research in Malta.

In the wake of the COVID-19 pandemic, non-communicable diseases (NCDs) have emerged as pressing global concerns. The issue begins with Dr. Sarah Cuschieri's article which highlights the impact of COVID-19 on NCDs, intensifying the burden on healthcare systems and exacerbating individuals' well-being. With pre-

valent conditions like type 2 diabetes, obesity, and low back pain in Malta, the pandemic has spotlighted these issues alongside mental illness and obesity. Despite challenges, vaccination rollouts offer relief in dampening the NCD burden. However, Dr. Cuschieri emphasizes the need for a syndemic approach to address intersecting epidemics, safeguarding population health and well-being through holistic strategies.

The issue continues with a contribution by David Pace on Clinical vaccine research in children in Malta. Clinical vaccine trials in children have become pivotal endeavors in pediatric healthcare, offering insights into optimizing vaccination schedules for existing vaccines. Dr. David Pace, in collaboration with esteemed colleagues in the UK, conducted significant clinical research on meningococcal C vaccines in children from 2010 to 2013. Their work, detailed in peer-reviewed journals, offers valuable insights into reduced-dose schedules and antibody response kinetics post-booster doses in infants. Such endeavors hold immense practical significance, particularly in informing national immunization policies, evident in the introduction of meningococcal vaccines into Malta's schedule. It's imperative that Malta's medical community continues to champion pediatric research, supported by clinical and academic institutions, to advance pediatric healthcare.

Advancements in electrical power systems are discussed by Alexander Micallef from the University of Malta's Faculty of Engineering. Insights into the microgrids research team's recent endeavors within the Department of Industrial Electrical Power Conversion (IEPC) are provided. Their work aims to foster secure, reliable, and environmentally sustainable electricity systems, focusing on enhancing microgrid operation, control, and management. Significant achievements include hierarchical control architecture development, innovative control algorithms, energy management strategies, power quality enhancement technologies, demand response techniques, and renewable energy source integration. These advancements

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Bekiros, Stelios	University of Malta
Cuschieri, Sarah	University of Malta
Camilleri, Mark Anthony	University of Malta
Baldacchino, Godfrey	University of Malta
Caruana, Albert	University of Malta
Grima, Joseph N.	University of Malta
Grech, Victor	Mater Dei Hospital
Scarpignato, Carmelo	United Campus of Malta
Borg, Michael A.	Mater Dei Hospital
Yannakakis, Georgios N.	University of Malta
Balzan, Mario V.	Malta College of Arts, Science & Technology
Valdramidis, Vasilis	University of Malta
Gatt, Ruben	University of Malta
Pace, David	Mater Dei Hospital
Sultana, Janet	Mater Dei Hospital
Attard, Daphne	University of Malta
Makantasis, Konstantinos	University of Malta
Magri, David C.	University of Malta
Francalanza, Adrian	University of Malta
Di Giovanni, Giuseppe	University of Malta

Table 1: The twenty Maltese scholars, as found in the 2021 top 2% list published by Stanford University and Elsevier.

underscore the department's commitment to shaping the future of electricity distribution through microgrid technology.

The latest research by Mark Anthony Camilleri and Adriana Caterina Camilleri highlights the importance of inclusive education, lifelong learning, and active labor market policies for societal well-being. Their comparative analysis of socio-economic policies in Malta and Cyprus underscores the need to attract more students to vocational and higher education to enhance employment prospects. Focused on vulnerable groups, their findings emphasize targeted labor market policies to support those not engaged in employment, education, or training. Continuous improvements in education quality and social cohesion are vital for positive outcomes like job creation and societal well-being, indicating the significance of effective policies for economic growth and social progress in Mediterranean island states.

Jean Claude Scicluna and Giuseppe Di Giovanni's systematic review addresses the pressing issue of fibromyalgia, a condition associated with significant morbidity and economic burden. Despite minimal benefits from traditional pharmacotherapies, there's growing interest in novel treatments. The endocannabinoid system has emerged as a potential target, yet the therapeutic potential and adverse effects of cannabis-based therapy remain underexplored, leading to clinician hesitancy. This review

critically evaluates the safety and efficacy of cannabis-based therapy for fibromyalgia, concluding that it presents a safe and effective treatment option. However, further research is warranted to fully understand its potential in managing this debilitating condition.

Gianluca Valentino and colleagues present a comprehensive overview of Interferometric SAR (InSAR) phase denoising and phase unwrapping techniques in their paper. These two critical steps in the InSAR pipeline are essential for generating accurate deformation maps. The paper surveys recent literature in this field, highlighting promising techniques and establishing benchmarks for performance evaluation. Additionally, the authors provide summaries of performance metrics for various methods. To illustrate the practical application of InSAR techniques, they offer an example of estimating deformation following a volcanic eruption. This study serves as a valuable resource for researchers and practitioners in the field of SAR image processing.

Georgios N. Yannakakis delves into the symbiotic relationship between artificial intelligence (AI) and digital games, highlighting how advancements in AI have revolutionized both fields. He explores how AI algorithms have driven breakthroughs in machine learning, search, and optimization, directly impacting game design and complexity. Yannakakis emphasizes the pivotal role of games in AI research and the reciprocal influence of AI on game

development. In the second part of the paper, he focuses on the Institute of Digital Games at the University of Malta as a prominent center for AI and games research, education, and innovation. Through targeted investment and national focus, Malta has emerged as a global leader in AI and video game development within a remarkably short timeframe, showcasing the transformative potential of strategic investment in this domain.

Brendon Scicluna explores the challenges of sepsis due to its heterogeneous nature, hindering the identification of effective treatments. He reviews current efforts in precision medicine, aiming to stratify sepsis patients into more uniform subgroups for targeted therapeutic interventions, ultimately enhancing treatment outcomes.

In their study, Balzan Mario and Leticia De Santis explore the influence of landscape and local habitat variables on honeybee and wild bee populations in the Maltese Islands. They find that honeybees, associated with agricultural habitats, overlap in resource use with wild bees. While different habitats support diverse bee groups, landscape factors like arable land and grassland positively affect wild bee abundance. High honeybee visitation negatively impacts wild bee abundance but does not significantly affect functional group richness. The study emphasizes the need for holistic habitat management approaches to conserve bee diversity and pollination services in the region.

David Magri's mini-review delves into the significance of the 2022 Nobel Prize in Chemistry, honoring the breakthroughs in click chemistry and biorthogonal chemistry. He focuses on two innovations: the Pourbaix sensor and the Lab-on-a-Molecule. These molecules, designed with fluorescence properties, operate through a balance between non-radiative photoinduced electron transfer (PET) and radiative fluorescence, modulated by various equilibrium states. Magri highlights their potential applications in corrosion detection, cell imaging, and health diagnostics, emphasizing their societal benefits.

The collection ends with the contribution of Alex Felice, one of the founders of Malta Chamber of Scientists, intertwining two narratives that deeply resonate with his professional journey. The first narrative is personal, tracing his career path from Malta to the USA and back, influenced by family and mentors, as well as the many graduate students and trainees he has mentored. This personal journey seamlessly merges with the second narrative, which focuses on the contributions made by Felice and his team to the study of Human Haemoglobinopathy. His research has shed light on the quantitative effects of genetic co-regulators on complex phenotypes, revealing how mutations at multiple alleles across different loci can influence the expression of β globin gene variants. This

intricate interaction extends to other molecules like α -globin and KLF1, the master regulator of Erythropoiesis, offering insights into rare diseases. Felice also highlights the impact of their work in training new health and academic professionals, establishing new resources and laboratories, and initiating international collaborations, all of which hold promise for expedited diagnoses and novel treatments in the field of rare diseases.

I would like to thank all the contributors who have made this volume exceptional, showcasing 11 of the most important acclaimed UM academics. I am grateful to these authors for their high standard of work and to the reviewers for their crucial help in the peer-review process.

I look forward to further issues of this Special Issue of Xjenza Online on Top Research in Malta series and wish all the best to all Maltese researchers.

References

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