mathematics

*Editorial*

# Preface to: Differential Geometry: Structures on Manifolds and Their Applications

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## 1. Motivation

When a manifold is endowed with a geometric structure, we have more opportunities to explore its geometric properties. Affine geometry, Riemannian geometry, contact geometry, Kälher geometry, *CR* geometry, or Finsler geometry are only a few examples of such differential geometric structures. Several theoretical and practical applications have been obtained over the years: mathematical physics, mathematical biology, economics, and so on. On the other hand, the theory of submanifolds represents an important field in differential geometry, especially when the ambient manifold carries geometric structures. The connection between the intrinsic geometry of the submanifold with its extrinsic geometry has been extensively developed in recent decades.

The goal of this Special Issue was to attract quality and novel papers in the field of "Differential Geometry: Structures on Manifolds and Their Applications".

When I agreed to be Guest Editor for this Special Issue, I first thought of Romanian and foreign geometers who are no longer among us and who have influenced me through their work, but also of contemporary geometers who, through the articles they publish, can lead to increasing the interest of young people at the beginning of their scientific career in choosing geometry as field of research.

The objective of this Special Issue was to put together papers from different fields in differential geometry. Some general keywords have been proposed, namely contact structures; distributions; geodesic and harmonic maps; delta invariants; minimal submanifolds; CR submanifolds; curvature. The response of the scientific community has been significant, many papers being submitted for consideration. In the end, eleven papers were accepted after going through a careful peer-review process based on quality and novelty criteria.

## 2. Thanks

As the Guest Editor of this Special Issue, I am very grateful to all authors who have contributed through their articles. I would also like to express my gratitude to all reviewers for their valuable comments, remarks, suggestions and criticisms toward the improvement of the submitted papers.

I hope that these research papers will be found to be of great interest and to have a big impact by the international scientific community. Furthermore, we anticipate and we are confident that these works will motivate other researchers to develop similar problems as well as to extend these topics to new research and to find new application fields.

I would like to thank the MDPI publishing editorial team, who gave me the opportunity of being Guest Editor for the Special Issue "Differential Geometry: Structures on Manifolds and Their Applications", especially to Dr. Nemo Guan for the support she offered me in managing all the manuscripts we received for this volume.

## 3. Statistics

In total, 27 manuscripts were sent to be considered for publication in this Special Issue, of which 11 papers were accepted and published, meaning that he acceptance rate was



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approximately 41%. Thirty-four authors from fourteen different countries (see Table 1) put in their effort and creativity to make this Special Issue possible.

**Table 1.** Geographic distribution of authors by country.

| | Country | Number of Authors |
|---|---|---|
| 1 | China | 7 |
| 2 | Croatia | 3 |
| 3 | Czech Republic | 2 |
| 4 | France | 1 |
| 5 | India | 1 |
| 6 | Japan | 1 |
| 7 | Korea | 1 |
| 8 | Mexico | 1 |
| 9 | Romania | 4 |
| 10 | Russia | 1 |
| 11 | Saudi Arabia | 5 |
| 12 | Spain | 3 |
| 13 | The Netherlands | 2 |
| 14 | Ukraine | 3 |

Note that it is usual for a paper to be written by more than one author and for authors to have multiple affiliations.

## 4. Specific Keywords

One can distinguish several topics that have been investigated in the papers of this Special Issue. In addition to the proposed keywords we have already presented in the beginning, we also have some specific ones that appeared in the papers [1–11] that we emphasize in Table 2.

**Table 2.** New keywords.

| | Specific Keywords: |
|---|---|
| (i) | Bertrand curves; Mannheim curves; spherical regular curves; spherical framed curves; singularity |
| (ii) | magnetic Jacobi field; cosymplectic manifold; magnetic curve |
| (ii) | torse-forming vector fields; concircular vector fields; torqued vector fields; Einstein manifolds; scalar curvature; Fischer–Marsden equation |
| (iv) | Golden Riemannian structure; warped product submanifold; pointwise slant; semi-slant; hemi-slant; bi-slant submanifold |
| (v) | contact geometry; geometric integrators; Liénard systems; nonlinear oscillations |
| (vi) | trans-Sasakian manifolds; Sasakian manifolds; Einstein–Sasakian manifolds; scalar curvature |
| (vii) | matrix manifolds; low-rank matrices; Grassmann manifold; principal bundles |
| (viii) | complex space; isotropic curve; rectifying curve; structure function |
| (ix) | singularities; partially null slant helix; pseudonull hypersurface; unfolding; semi-euclidean space |
| (x) | Lorentz–Minkowski 3-space; pseudo-null curve; involute; null curve |
| (xi) | canonical almost geodesic mappings; Cauchy-type PDEs; space with affine connection; Ricci symmetric space |

## 5. Conclusions

Geometry, in particular differential geometry, considered to have been born in the middle of the 19th century, had—and still has—several applications not only in mathematics but also in art and many other sciences (Traditionally, art and science have been treated as two separate disciplines, but when they are studied together, it is clear to see the impact one has on the other) such as Theoretical Physics, Computer-Aided Geometric Design and Computer-Aided Manufacturing, Robotics, Architecture, Sculpture, Civil Engineering, Astronomy and, last but not least, Geometric Deep Learning. So, I do not think I'm exaggerating by saying that geometry is everywhere around us. I remember the words of one of my teachers saying that "geometry is part of the human civilization".

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