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## **Journal of Materials – Design and Applications: Twenty years of contributions to the materials technology**

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► **To cite this version:**

Silvio DE BARROS, R.G. Barbastefano, C.G. de Souza, Lucas F.M. da Silva. Journal of Materials – Design and Applications: Twenty years of contributions to the materials technology. Proceedings of the Institution of Mechanical Engineers, Part L: Journal of Materials: Design and Applications, 2019, 233 (4), pp.541-545. 10.1177/1464420719828607 . hal-04260434

**HAL Id: hal-04260434**

**<https://hal.science/hal-04260434>**

Submitted on 27 Oct 2023

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# Journal of Materials – Design and Applications: Twenty years of contributions to the materials technology

Proc IMechE Part L:  
J Materials: Design and Applications  
2019, Vol. 233(4) 541–545  
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sagepub.com/journals-permissions  
DOI: 10.1177/1464420719828607  
journals.sagepub.com/home/pil



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and LFM da Silva<sup>3</sup>

*Proceedings of the Institution of Mechanical Engineers Part L – Journal of Materials – Design and Applications* (JMDA) is celebrating 20 years of existence. This periodical is dedicated to the use and design of materials – such as metals, ceramics, polymers, and composites, for application in the context of engineering. Created in 1999, this journal has sought to publish top-quality articles, covering a variety of important areas related to materials technology.

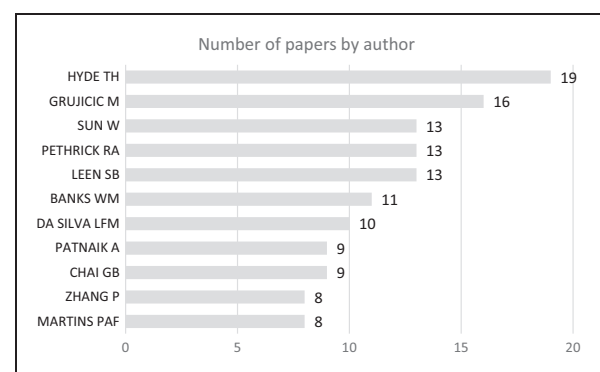
To celebrate this anniversary, some data on the evolution of this journal are presented in this editorial, which has served as a vehicle for disseminating the results of the research conducted in materials technology. It is through the set of published articles that the memory of a certain area can be preserved, being able to map how the evolution of knowledge occurred, as well as the name of researchers who have contributed over time.

It is also through the published articles that competence centers in diverse subjects and collaborative relationships between researchers can be identified, forming a research network that portrays the scientific community of a certain field of knowledge.

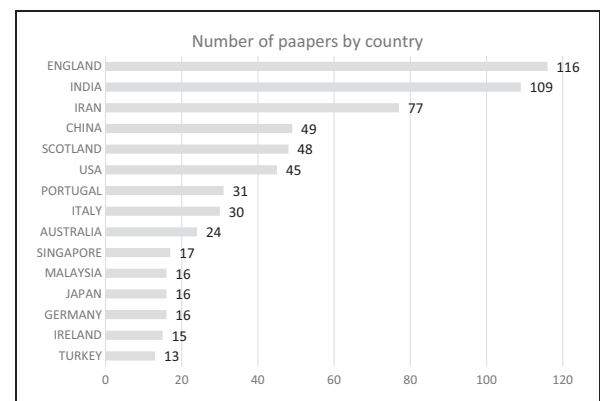
Thus, the following sections attempt to illustrate the journal's importance in portraying individual areas. The data presented were obtained from a survey of articles and reviews published over the last 20 years, through Web of Science (WoS), Scopus, and Journal Citation Report (JCR) databases.

**Table 1.** Evolution through time (cumulative 1999–2018).

Indicator	1999–2003	1999–2008	1999–2013	1999–2019
Articles and reviews	108	244	371	664
Countries	29	36	43	56
Institutions	139	239	345	616
Authors	255	574	891	1669



**Figure 1.** Most represented authors since 1999.



**Figure 2.** Most represented countries since 1999.

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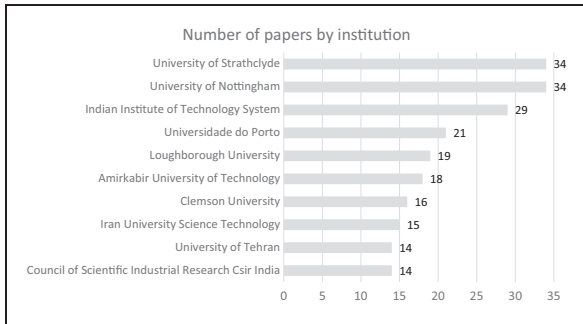


Figure 3. Most represented institutions since 1999.

### Community growth

Over the 20 years of its existence, JMDSA had a total of 664 publications – considering only articles and reviews, covering 56 countries, 616 institutions, and 1669 different authors. Table 1 shows this evolution over time considering periods of five years.

The most represented authors contributing to the journal since its launch, as well as the number of papers published by each one, is shown in Figure 1.

Table 2. Main countries, institutions, and authors in each period.

Indicator	1999–2003	2004–2008	2009–2013	2014–2018
Countries	England	England	India	India
	Scotland	Scotland	Iran	Iran
	USA	USA	China	Portugal
Institutions	University of Strathclyde	University of Nottingham	Indian Institute of Technology System	Indian Institute of Technology System
	Imperial College London	University of Strathclyde	University of Strathclyde	Universidade do Porto
	Loughborough University	Loughborough University	Zhengzhou University	University of Tehran
Authors	Sharma SC	Hyde TH	Chai GB	Martins PAF
	Smith DJ	Leen SB	Grujicic M	Patnaik A
	Tobushi H	Sun W	Li QF	da Silva LFM

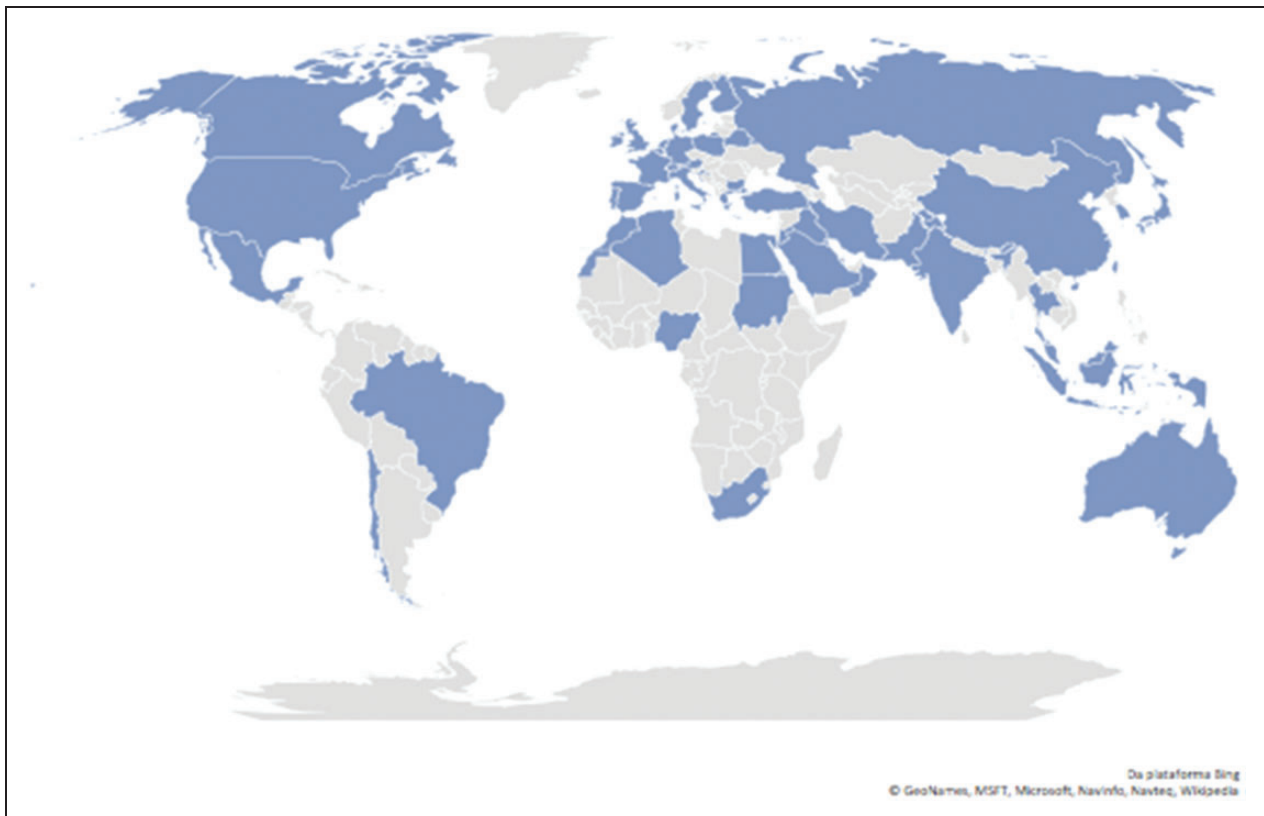


Figure 4. Map of dissemination in the world.

The most represented countries and institutions publishing in the journal in the last two decades are presented in Figures 2 and 3.

It is also interesting to note the changes in the contribution sources over the years. Table 2 summarises the top three countries, institutions, and authors who published most in each period. During the first decade, the journal mainly received submission from England, Scotland, and the USA. On the other hand, in the last decade, many authors from countries like India and Iran started to consider the journal as a forum for the dissemination of their research.

### Science dissemination and collaboration

Figure 4 shows the map of the countries with article or review publication in the 20 years of JMDSA. One can see that it has become a worldwide journal.

The analysis of the data collected for the last 20 years also allows establishing the network of scientific collaboration created around the journal. Figure 5 presents the collaboration network considering the countries.

Table 3 shows the number of papers published considering the number of authors in each paper.

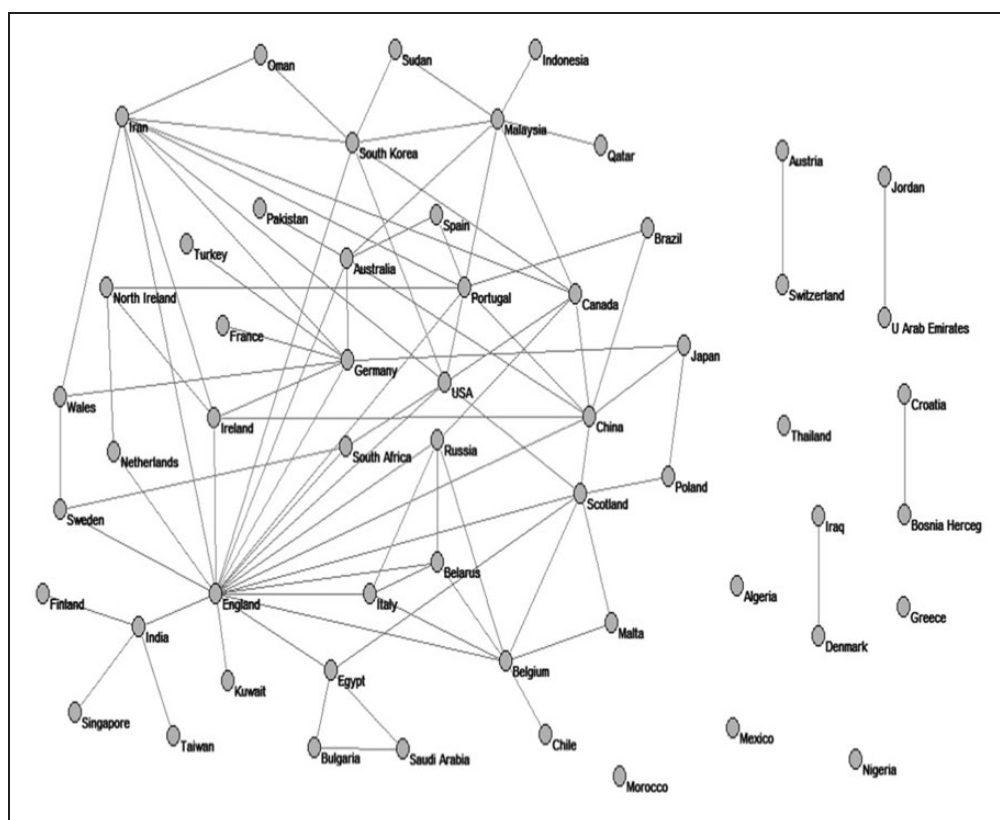


Figure 5. Collaboration network of countries.

Table 3. Co-authorship indicators.

Authors	1999–2003	2004–2008	2009–2013	2014–2018	1999–2018
Articles	108	136	127	293	664
1 Author	15	11	8	13	47
2 Author	27	26	32	45	130
3 Author	39	47	43	100	229
4 Authors	16	29	21	73	139
5 Authors	8	17	12	36	73
6 Authors or more	3	6	11	26	46
Average	2.86	3.24	3.31	3.57	3.34

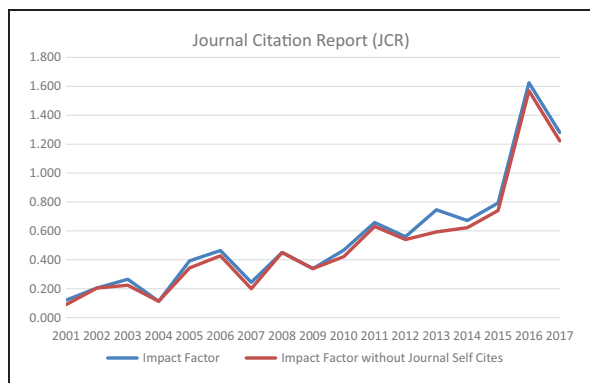


Figure 6. Evolution of the journal impact factor.

Table 4. Web of Science research areas.

Categories	Documents
Materials Science Multidisciplinary	1017
Engineering Mechanical	517
Materials Science Composites	452
Mechanics	347
Engineering Manufacturing	268
Metallurgy Metallurgical Engineering	196
Polymer Science	193
Engineering Multidisciplinary	191
Engineering Chemical	167
Physics Applied	142
Engineering Civil	138
Materials Science Characterization Testing	125
Nanoscience Nanotechnology	79
Engineering Electrical Electronic	78
Instruments Instrumentation	76
Materials Science Coatings Films	57
Automation Control Systems	54
Chemistry Physical	52
Construction Building Technology	51
Materials Science Textiles	50

The average number of authors by paper jumps from 2.86 in the first five years of the journal to 3.57 currently.

## Journal impact

Figure 6 shows the evolution of the impact factor (IF) of JMDA according to the JCR published by WoS. Two curves are presented – with and without self-citation – and it is important to note that they are very close, which shows that the IF of the journal results essentially from citations made in other journals.

Table 5. Web of Science indexed journals.

Source	Documents
Composite Structures	92
Journal of Materials Design and Applications	89
Composites Part B Engineering	75
International Journal of Adhesion and Adhesives	71
Composites Part A Applied Science and Manufacturing	63
Materials Design	47
Journal of Adhesion	41
International Journal of Advanced Manufacturing Technology	38
Journal of Composite Materials	37
Journal of Materials Engineering and Performance	35
Journal of Reinforced Plastics and Composites	31
Procedia Engineering	31
Composites Science and Technology	30

A total of 114 categories of the WoS contain documents – including all types of publications indexed, which cited articles published in the journal. Table 4 presents the list of categories that had at least 50 documents citing papers from JMDA.

In the case of the journals, 943 titles of publications indexed in WoS contain documents that have cited articles of JMDA. Table 5 shows the source titles that contain at least 30 documents that cited articles published in the journal. These documents may include editorials, letters, etc. that may have cited some of the articles or reviews published in JMDA. Authors publishing in journals on composites materials and adhesion science seem to be the most regular readers of JMDA. The journal “Composites Structures” appears at the top of the list with 92 documents published citing JMDA, for instance.

The 10 most cited articles with their authors, publication year, number of citations received, and average citations per year are presented in Table 6. These data confirm the quite known idea that review papers tend to be well cited.

## Articles' profile

In what concerns the research method used, a closer look in the keywords mentioned by the authors suggests that “Finite Element Method” is the most important. Table 7 presents the top four keywords indicated by the authors in each five-year period.

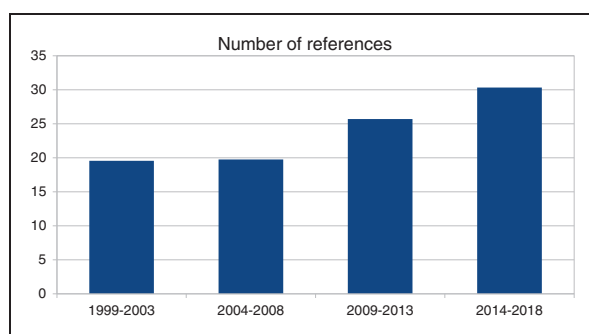
Figure 7 shows the average amount of bibliographic references used in the articles published in JMDA. It is observed that there has been an increase in the average number of references used throughout the analyzed periods.

**Table 6.** Most cited papers.

Title	Authors	Year	Total no. of citations	Citations per year
Adhesively bonded joints in composite materials: an overview	Banea MD; da Silva LFM	2009	196	19.60
Magnetorheological fluid devices: principles, characteristics and applications in mechanical engineering	Wang J; Meng G	2001	70	3.89
The effect of temperature on the mechanical properties of adhesives for the automotive industry	Banea MD; da Silva LFM	2010	54	6.00
Processing of all-polypropylene composites for ultimate recyclability	Cabrera N; Alcock B; Loos J; et al.	2004	52	3.47
A review of low-velocity impact on sandwich structures	Chai GB; Zhu S	2001	51	6.38
A new theory for laminated composite plates	Karama M; Afaq KS; Mistou S	2009	50	5.00
Effect of the properties of the polymer materials on the quality of selective laser sintering parts	Shi Y; Li Z; Sun H; et al.	2004	48	3.20
Low-pressure (vacuum infusion) techniques for moulding large composite structures	Summerscales J; Searle TJ	2005	46	3.29
Physically based damage models for laminated composites	McCartney LN	2003	44	2.75
Selective generation of Lamb wave modes and their propagation characteristics in defective composite laminates	Su Z; Ye L	2004	41	2.73

**Table 7.** Keywords according to Scopus.

1999–2003	2004–2008	2009–2013	2013–2018
Composites	Finite Element Method	Finite Element Method	Finite Element Method
Stress analysis	Computer Simulation	Mechanical Properties	Mechanical Properties
Thermal effects	Mathematical Models	Fibers	Scanning Electron Microscopy
Bending (deformation)	Residual Stresses	Scanning Electron Microscopy	Aluminum Alloys

**Figure 7.** Quantity of references used in the articles.

## Conclusion

The material most covered in the papers is composites and the tool used to design is the finite element method as would be expected. The journal has

become truly international with papers from all over the world, with the emerging countries such as India, China, and Iran being the most dynamic contributors. The figures presented in the graphs and tables above show a clear growth of JMDA at all levels: number of papers published, number of citations, IF, etc. As the number of submissions is increasing, the journal expects more and better publications in the future. The editorial team is very pleased with the current position of JMDA and would like to thank all the authors that have contributed and will in the future.