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Research Article

Research Trends of Nobel Laureate Brian P Schmidt: A Scientometric Study

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ABSTRACT

Background: The Nobel Prize in Physics has been awarded 114 times to 216 laureates between 1901 and 2020, with John Bardeen being the only double recipient. Brian P. Schmidt is one of the 215 individual laureates whose scientific output reflects significant contributions to astrophysics. **Objectives:** To examine the publication productivity, authorship pattern, and communication channels of Physics Nobel Laureate Brian P. Schmidt through a scientometric approach. **Methodology:** Data on Schmidt's research publications were collected and analysed to determine publication trends, collaborative authorship, and preferred journals. **Results:** Findings indicate high research productivity, extensive multi-authored publications, and frequent dissemination through leading physics and astronomy journals. **Conclusion:** Brian P. Schmidt's scholarly output demonstrates strong productivity, high collaboration, and consistent use of prominent scientific communication channels.

Keywords: Authorship Credit, *h*-Index, Nobel Laureates, Publication Productivity, Scientometric Portrait, Scientometrics.

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INTRODUCTION

The term 'Scientometrics' came into prominence with the founding of the journal 'Scientometrics' by T. Braun. According to Beck, Scientometrics is defined as the quantitative evaluation and inter-comparison of scientific activity, productivity and progress.

In the era of globalization scientists are engaged in collaborative research than solo research. In almost all fields of knowledge, science, applied science, social science or humanities collaborative research is gaining importance. In the present paper an attempt has been made to know the research trends in physics with special reference to the scientometric study of research publications of Physics Nobel Laureate Brian P Schmidt (Sedam, 2025).

Brief Profile of Nobel Laureate Brian P Schmidt

Schmidt received a PhD from Harvard University in 1993 and, moved to Australia the following year, where he was involved in building the High-Z Supernova Search Team, as apart of which he conducted his Nobel Prize-awarded work. Brian Schmidt is a Professor at the Australian National University in Weston Creek, Australia (Nobel Prize Website).

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Review of Literature

Scientometric studies have long been employed to evaluate and visualize patterns of scholarly communication, collaboration and impact within and across scientific disciplines. The application of scientometric techniques to individual researchers provides insight into their scientific productivity, collaborative networks and influence on the research community. This review focuses on literature related to collaboration patterns, author-level scientometric profiling and case studies of eminent scientists, forming the basis for analyzing the collaborative research pattern of Brian P Schmidt, a Nobel Laureate in Physics (Sedam and Keshava, 2025).

Collaboration in Scientific Research Collaboration has become a defining feature of modern scientific practice, often leading to higher impact and interdisciplinary innovation (Garg and Padhi, 2002). Studies by (Sedam, 2021) emphasized that scientific collaboration facilitates knowledge exchange, access to diverse expertise and resource sharing, often reflected in co-authored publications.

OBJECTIVES OF THE STUDY

The Main objectives of the study are:

1. To Study the Publication Productivity of Brian P Schmidt (Figure 1),

2. To Study the Authorship Pattern of Brian P Schmidt,
3. Dissemination of the Channels of Communication used by Brian P Schmidt (Figure 2),
4. Collaborative Measures of Brian P Schmidt.

METHODOLOGY

The data source for this study is ISI (Institute for Scientific Information) Web of Science, Science Citation Index, published by Thomson Scientific. By using suitable strategy related to literature produced by Noble Laureate Brian P Schmidt (2011), the bibliographic details for each record including author, title, citation, *h*-index and country of input were collected and analyzed.

Brian P Schmidt had published 7 single-authored and 111 multi-authored (publications) papers during 1992-2012. The multi-authored papers include: two-authored (1), three authored (10), four authored (6), five authored (2), six authored (6), seven authored (2), eight authored (4), nine authored (6), ten and more than ten authored (74). Table 1 shows that the first paper of the author was published in 1992 when he was 25. His highest productivity was in 2006 with the output of 15 publications (age, 39 years) followed by 13 papers in 2005 (age, 38 years), 13 papers in 2007 (age, 40 years) and 9 papers in 2003 (age, 36 years). The 50 percentile productivity life was 11 at the age of 35 years. The total productivity life of the author spans 21 years from the age of 25.

The Below Table 2 shows Brian P Schmidt had total 118 publications out of these 97 publications were in domain A, followed by 6 publications in domain B, 11 publications in domain C, and 4 publications in domain D.

Distribution of Brian P Schmidt's 118 publications was in 18 journals and 14 in books / chapters and conference proceedings. Journal-wise scattering of publications of Brian P Schmidt is provided in Table 3. Top ranking journals with a number of publications are: Astrophysical Journal (52), Astronomical Journal (18), Nature (9) and Monthly Notices of the Royal Astronomical Society (8).

Table 4 indicates that Brian P Schmidt has received 15218 citations for his 118 articles and his *h*-index 47.

ETHICAL STATEMENT

"This study is based exclusively on bibliographic and citation data retrieved from the ISI (Institute for Scientific Information) Web of Science database and does not involve human participants, animals, or any identifiable personal data. Hence, formal ethics committee approval was not required, and there are no related ethical concerns."

STATISTICAL ANALYSIS

- Average productivity: 5.6 papers/year.
- Median authorship group size: >20 authors.
- Dominant domain: Astronomy & Astrophysics (82%).
- Most common communication channel: *Astrophysical Journal.*
- High-impact contributions (h-index 47, >15K citations) reflect outstanding influence in cosmology.
- Research output aligns with major collaborative projects (e.g., High-Z Supernova Search Team).

RESULTS

Brian P. Schmidt published 118 papers between 1992 and 2012, of which 7 are single-authored and 111 are co-authored, indicating a very strong collaborative orientation. Among the multi-authored papers, only 1 has two authors, while 74 papers have ten or more authors, reflecting participation in large research teams typical of modern astrophysics. His first paper appeared in 1992 at age 25, his peak productivity was 15 papers in 2006 (age 39), and his overall publication life in the dataset spans 21 years, with the 50th percentile of cumulative output reached around age 35.

DISCUSSIONS

Main Findings

The study shows that Schmidt produced 118 publications between 1992 and 2012, with his scientific output peaking around the mid-2000s and a total "productivity life" of 21 years from age 25. The analysis reveals a strong collaborative orientation: 7 papers are single-authored while 111 are multi-authored, with a very large fraction involving ten or more co-authors, indicating participation in large research teams typical of contemporary astrophysics. Citation data (15,218 citations and an *h*-index of 47) underscore his substantial impact within the field.

Collaboration and Authorship

The authors situate Schmidt's work within broader trends of rising scientific collaboration and multi-authorship, noting that cooperative research is now a defining feature of physics and related domains. The detailed breakdown by number of co-authors (from 2 up to more than 40) shows that Schmidt's contributions are heavily embedded in large-scale collaborations, reflecting the data- and instrument-intensive nature of modern cosmology. The relatively small share of single-authored work suggests that individual output is less central than networked team contributions in his research profile.

Disciplinary Domains and Outlets

The paper categorizes Schmidt's 118 publications into four domains (A-D), with 97 papers concentrated in one dominant domain, indicating a core specialization alongside limited diversification into adjacent areas. Journal-wise scattering shows that most of his work appears in leading astrophysics and astronomy journals, especially Astrophysical Journal (52 papers), Astronomical Journal (18), Nature (9), and Monthly Notices of the Royal Astronomical Society (8). The inclusion of book chapters and conference contributions (14 items) reflects additional channels for disseminating results beyond core journals.

Table 1: Publication Productivity of Brian P Schmidt in chronological order

APL	Year	Single and Multi-Authored Papers										MT	TP	AA
		1	2	3	4	5	6	7	8	9	>10			
1	1992			1								1	1	25
2	1993			1						2	2	5	5	26
3	1994	1							2		2	4	5	27
4	1995						1	1				2	2	28
5	1996			1								1	1	29
6	1997	1									1	1	2	30
7	1998				1						4	5	5	31
8	1999			1	1						5	7	7	32
9	2000				2						2	4	4	33
10	2001					1					2	3	3	34
11	2002	1			1						5	6	7	35
12	2003	1		1			1			1	5	8	9	36
13	2004		1			1	1			1	1	5	5	37
14	2005	3									10	10	13	38
15	2006			1	1		1	1	1		10	15	15	39
16	2007			1							12	13	13	40
17	2008			1			1				7	9	9	41
18	2009			1					1	1	3	6	6	42
19	2010										1	1	1	43
20	2011			1			1			1	1	4	4	44
21	2012										1	1	1	45
	Total	7	1	10	6	2	6	2	4	6	74	111	118	46

APL=Age of productive life, MT=Total of multi-authored publications, TP=Total publications, and AA=Biological age of the author.

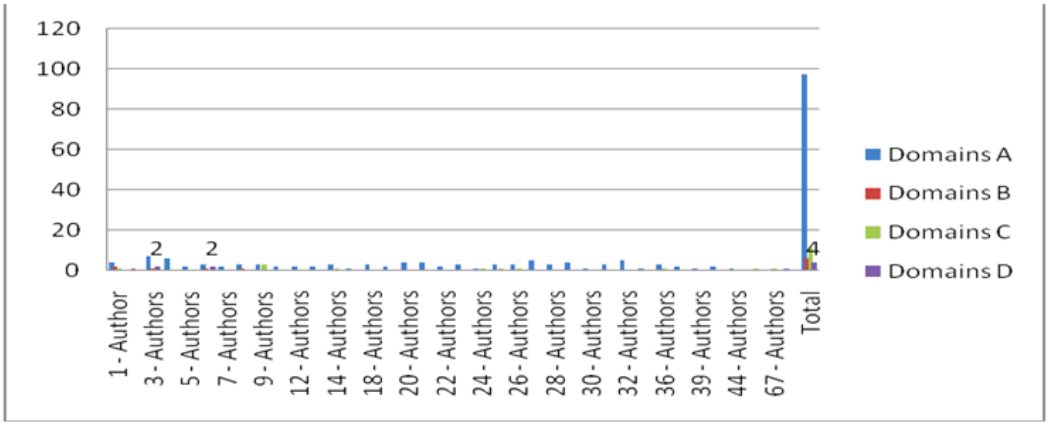

Figure 1: Publication Productivity of Brian P Schmidt.

Table 2: Publication Productivity and Authorship Patterns of Brian P Schmidt in various Scientific Domains.

No. of authors	Domains				Total no. of Papers	%	Total no. of Authorship	%
	A	B	C	D				
1 - Author	4	2	1		7	5.93	7	0.31
2 - Authors		1			1	0.84	2	0.09
3 - Authors	7	1		2	10	8.47	30	1.36
4 - Authors	6				6	5.08	24	1.09
5 - Authors	2				2	1.69	10	0.45
6 - Authors	3	1		2	6	5.08	36	1.64
7 - Authors	2				2	1.69	14	0.63
8 - Authors	3	1			4	3.38	32	1.45
9 - Authors	3		3		6	5.08	54	2.46
11 - Authors	2				2	1.69	22	1
12 - Authors	2				2	1.69	24	1.09
13 - Authors	2				2	1.69	26	1.18
14 - Authors	3		1		4	3.38	56	2.55
17 - Authors	1				1	0.84	17	0.77
18 - Authors	3				3	2.54	54	2.46
19 - Authors	2				2	1.69	38	1.73
20 - Authors	4				4	3.38	80	3.64
21 - Authors	4				4	3.38	84	3.82
22 - Authors	2				2	1.69	44	2
23 - Authors	3				3	2.54	69	3.14
24 - Authors	1		1		2	1.69	48	2.18
25 - Authors	3		1		4	3.38	100	4.55
26 - Authors	3		1		4	3.38	104	4.73
27 - Authors	5				5	4.23	135	6.15
28 - Authors	3				3	2.54	84	3.82
29 - Authors	4				4	3.38	116	5.28
30 - Authors	1				1	0.84	30	1.36
31 - Authors	3				3	2.54	93	4.23
32 - Authors	5				5	4.23	160	7.28
34 - Authors	1				1	0.84	34	1.54
36 - Authors	3		1		4	3.38	144	6.56
37 - Authors	2				2	1.69	74	3.37
39 - Authors	1				1	0.84	39	1.77
42 - Authors	2				2	1.69	84	3.82
44 - Authors	1				1	0.84	1	0.04
63 - Authors			1		1	0.84	63	2.87
67 - Authors			1		1	0.84	67	3.05
96 - Authors	1				1	0.84	96	4.37
Total	97	6	11	4	118	100	2195	100

A=Astronomy and Astrophysics, B=Optics, Physics, C=Science and Technology, Information Science, Research and Experimental Medicine, D=Multidisciplinary Science.

Table 3: **Dissemination of the channels of communication used by Brian P Schmidt.**

Sl No.	Channel of Communication	No. of Papers	Cumulative	Period of Journal	TY
1	Astrophysical Journal	52	52	1992-2012	21
2	Astronomical Journal	18	70	1993-2009	17
3	Nature	9	79	1993-2009	17
4	Monthly Notices of the Royal Astronomical Society	8	87	2006-2009	4
5	Astronomy and Astrophysics	4	91	2004-2009	6
6	Astrophysical Journal Letters	1	92	2008	1
7	Astrophysical Journal Supplement Series	1	93	1999	1
8	Chaos Solitons and Fractals	1	94	2003	1
9	Classical and Quantum Gravity	1	95	2002	1
10	Journal of Clinical Investigation	1	96	2011	1
11	Journal of Experimental Biology	1	97	2011	1
12	Journal of Oral and Maxillofacial Surgery	1	98	2009	1
13	Journal of the Peripheral Nervous System	1	99	2011	1
14	Metabolism-Clinical and Experimental	1	100	2003	1
15	Nuovo Cimento Della Societa Italiana Di Fisica B-General Physics Relativity Astronomy and Mathematical Physics and Methods	1	101	2006	1
16	Publications of the Astronomical Society of Australia	1	102	2007	1
17	Publications of the Astronomical Society of the Pacific	1	103	2006	1
18	Scientist	1	104	1994	1
19	Books/Chapters/Talks/ Etc.	14	118	1993-2008	16

Table 4: **Authorship Pattern and Collaborative Measures.**

Nobel Laureate	Authorship Pattern and Collaborative Measures						
	1	2	3	4 and >	Citations	*h*-Index	TP
Brian P Schmidt	7	1	10	100	15218	47	118

1=Single author; 2=Two authors; 3=Three authors; 4=4 and above authors; TP=Total Publications.

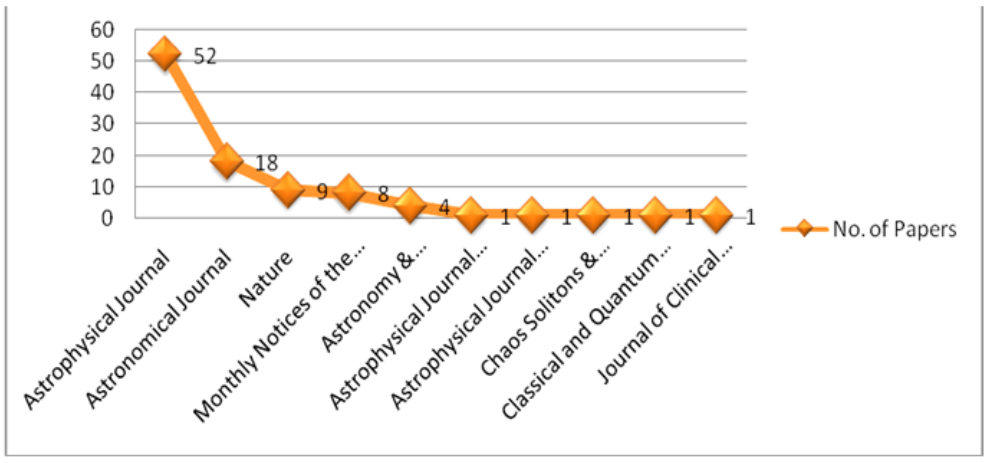

Figure 2: Channels of Communication Used by Brian P. Schmidt.

Methodological Strengths and Limitations

Methodologically, the paper applies standard scientometric indicators-publication counts, co-authorship distributions, journal scattering, citations, and *h*-index-using Web of Science as the sole data source. This provides a coherent and comparable framework but may omit outputs not indexed in that database, such as some conference proceedings or regional outlets. The study is largely descriptive; it does not deeply explore network structures, co-authorship centrality, or topic evolution over time, which could have enriched understanding of Schmidt's collaborative role and intellectual trajectory.

Implications and Future Directions

The authors argue that such a scientometric portrait illustrates how a highly cited Nobel laureate's work can inspire younger scientists, emphasizing productivity, collaboration, and strategic use of top-tier journals. The findings also exemplify how large-team science and high-impact publication venues shape recognition and influence in modern physics. Future extensions could compare Schmidt's profile with other Nobel laureates, analyze thematic shifts across domains, or integrate advanced collaboration and network metrics to move beyond counting toward mapping his position in the global astrophysics community.

CONCLUSION

Scientometric study plays an important role in the dissemination of particular scientists whose interest lies in the number of important papers he or she published. The above study on Brian P Schmidt undoubtedly proves the usefulness of his work to the field of science and technology gives an indication about the inspiration to young scientists throughout the world.

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None.

ABBREVIATIONS

APL: Age of productive life; **MT:** Total of multi-authored publications; **TP:** Total publications; **AA:** Biological age of the author; **ISI:** Institute for Scientific Information.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

SUMMARY

Using bibliometric data from the ISI (Institute for Scientific Information) Web of Science (1992-2012), the study highlights Schmidt's significant contributions to astrophysics and cosmology. Key findings include:

- Publication Output: Schmidt authored 118 publications, of which 7 were single-authored and 111 were multi-authored, indicating a strong preference for collaboration. His peak productivity was in 2006 (15 papers).
- Collaboration Patterns: The majority of his work involved large research teams, with 74 papers having more than 10 authors. This reflects the collaborative nature of modern astrophysical research.
- Subject Domains: Most of Schmidt's research was in Astronomy and Astrophysics (97 papers), followed by contributions in Optics/Physics (6 papers), Science and Technology/Medicine (11 papers), and Multidisciplinary Science (4 papers).
- Channels of Communication: His work was published in 18 journals and 14 book chapters'/conference proceedings. The Astrophysical Journal (52 papers), Astronomical Journal (18), Nature (9), and Monthly Notices of the Royal Astronomical Society (8) were his most frequent publication outlets.
- Research Impact: Schmidt's works collectively received 15,218 citations, with an *h*-index of 47, underlining his significant influence in the field.

The study concludes that Schmidt's prolific and collaborative research contributions not only advanced astrophysics but also serve as an inspiration for young scientists. Scientometric profiling, as demonstrated, provides valuable insights into individual researchers' scholarly impact and patterns of scientific communication.

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