

Bibliometric statistics – Porous Media Group (PMG) 2012-2022

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Background: Request from Group Leader Inga Berre via Veljko Lipovac (researcher) in connection with RCNs EVALMIT 10-year evaluation. Publications identified via a list provided by the research group, based on data from Web of Science 2012-2022 – 237 publications. In this analysis, one publication could not be found in Cristin and was not included (A vertically integrated model with vertical dynamics for CO₂ storage, 10.1002/2013WR015215). The starting point is thus a total number of 236 published articles.

Background reference: [Bibliometric report for Department of Mathematics at UiB](#)

Analyses are based on Cristin and NIB¹ data. The below are covered (references to tables and figures in this list refer to items in the NIFU report above which are recreated here for PMG):

1. An overview of publishing venues (Table 1.1)
2. Clustering according to academic fields (like in Figure 1.2).
3. Percentage of national/international papers (Figure 1.4)
4. List of highly cited papers (Data analogous to Table 1.3)
5. Citation indicators: Proportion of highly cited papers (10% percentile) and relative citation indicators (table 1.2) using a normalization with respect to the academic field.

1. Overview of publishing channels

Share of total = Percentage of PMGs publications (236) published in this journal.

Table 1 Most frequently used journals (2012-2022), top 10 ranged by number of publications from PMG

<i>Journal</i>	<i>Publications</i>	<i>Share of total</i>
Computational Geosciences	34	14.4%
Water Resources Research	16	6.8%
International Journal of Greenhouse Gas Control	14	6.0%
Transport in Porous Media	14	6.0%
Advances in Water Resources	13	5.5%
Computer Methods in Applied Mechanics and Engineering	11	4.7%
Journal of Computational Physics	10	4.2%
SIAM Journal on Numerical Analysis	8	3.4%
Journal of Computational and Applied Mathematics	7	3.0%
International Journal for Numerical Methods in Engineering	6	2.5%

2. Clustering in academic fields

Here the same system is used as the NIFU report for Department of Mathematics. See their description:

“This is based on the classification system of CRISTIN, where the journals and publication channels have been assigned to different categories according to their content (journal-based research field delineation). There are separate categories for articles in multidisciplinary journals (e.g. PlosOne). Further information on the classification system and its field categories, can be found on the webpages of the [Norwegian Publication Indicator](#). It should be noted that some publications may

¹ <https://sikt.no/tjenester/nasjonal-infrastruktur-bibliometri-nib> ; Citations as of August 2023

3. International and national cooperation

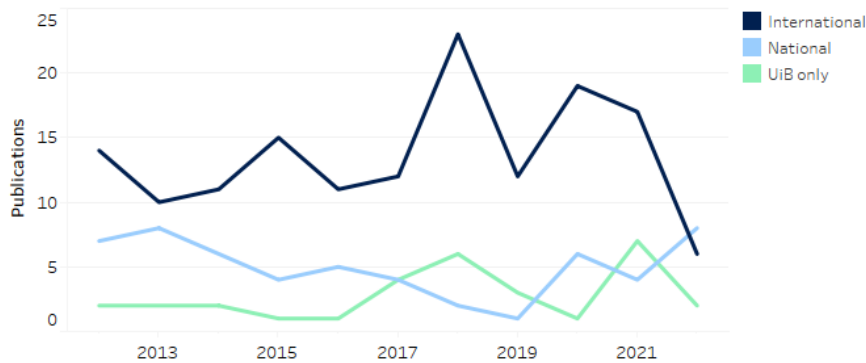


Figure 3 Number of PMG publications with international co-authorship, national co-authorship, or only UiB (co-)authorship.

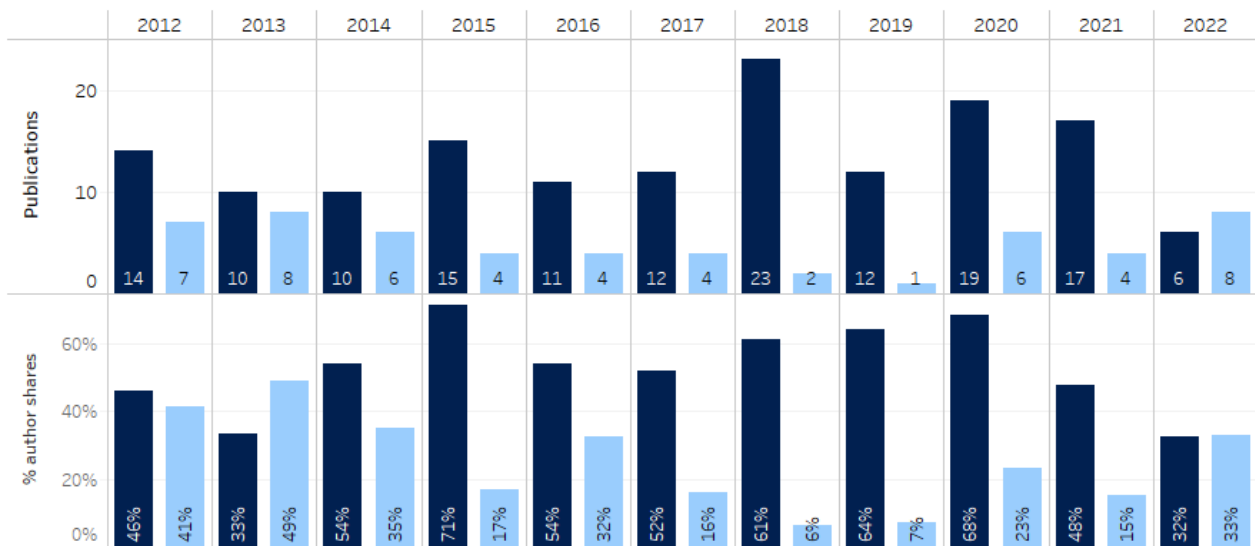


Figure 4 Number of publications and percentage of UiB author shares in PMG publications that are from publications with international co-authors (dark blue) or national co-authors (light blue, more than only UiB authorship). The percentage of author shares is calculated as a percentage of all UiB author shares from PMG publications.

Share of total = Percentage of PMGs publications (236) published in collaboration with this institution.

Table 2 Top 15 collaborating institutions and their share in total number of published articles.

Rank	Affiliations	No. co-authored publications	Share of total
1	PRINCETON UNIVERSITY	44	18.6%
2	UNI RES CIPR	24	10.2%
3	NORWEGIAN RESEARCH CENTRE NORCE	19	8.1%
4	HASSETL UNIVERSITY	17	7.2%
5	SINTEF	17	7.2%
6	CHRISTIAN MICHELSEN RES	16	6.8%
7	UNIVERSITY OF STUTTGART	12	5.1%
8	TECHNICAL UNIVERSITY OF MUNICH	10	4.2%
9	UNIVERSITY OF ERLANGEN NUREMBERG	10	4.2%
10	HAUKELAND UNIVERSITY HOSPITAL	9	3.8%
11	KARLSTAD UNIVERSITY	8	3.4%

12	UNIVERSITY OF OSLO	8	3.4%
13	EINDHOVEN UNIVERSITY OF TECHNOLOGY	7	3%
14	POLYTECHNIC UNIVERSITY OF MILAN	7	3%
15	ROMANIAN ACADEMY OF SCIENCES	7	3%

4. Highly cited articles

Table 3 Publications from PMG that are in the top 10% cited works (after normalisation of citations for year, publication type and field). **Percentile** indicates the percentile the work is in according to citations, while **Citations** are raw counts.

Cristin result id	Title	Year	Journal	Percentile	Citations
1519011	Benchmarks for single-phase flow in fractured porous media	2018	<i>Advances in Water Resources</i>	0.44	132
1636814	Robust discretization of flow in fractured porous media	2018	<i>SIAM Journal on Numerical Analysis</i>	0.97	64
959481	Open-source MATLAB implementation of consistent discretisations on complex grids	2012	<i>Computational Geosciences</i>	0.98	242
1436402	Robust fixed stress splitting for Biot's equations in heterogeneous media	2017	<i>Applied Mathematics Letters</i>	1.32	60
1346262	A study on iterative methods for solving Richards' equation	2016	<i>Computational Geosciences</i>	1.42	129
1601330	Anderson accelerated fixed-stress splitting schemes for consolidation of unsaturated porous media	2019	<i>Computers and Mathematics with Applications</i>	1.58	43
912303	An efficient multi-point flux approximation method for Discrete Fracture–Matrix simulations	2012	<i>Journal of Computational Physics</i>	1.82	147
1909409	Verification benchmarks for single-phase flow in three-dimensional fractured porous media	2021	<i>Advances in Water Resources</i>	1.98	30
1038858	Stochastic exponential integrators for the finite element discretization of SPDEs for multiplicative and additive noise	2013	<i>IMA Journal of Numerical Analysis</i>	2.52	63
1909879	PorePy: an open-source software for simulation of multiphysics processes in fractured porous media	2021	<i>Computational Geosciences</i>	2.53	31
1824804	Functional analysis and exterior calculus on mixed-dimensional geometries	2021	<i>Annali di Matematica Pura ed Applicata</i>	2.87	13
1480184	A robust, mass conservative scheme for two-phase flow in porous media including Hoelder continuous nonlinearities	2018	<i>IMA Journal of Numerical Analysis</i>	2.99	37
1611260	Dual virtual element method for discrete fractures networks	2018	<i>SIAM Journal on Scientific Computing</i>	2.99	37
1256430	A robust linearization scheme for finite volume based discretizations for simulation of two-phase flow in porous media	2015	<i>Journal of Computational and Applied Mathematics</i>	3.38	47
1521256	High-accuracy phase-field models for brittle fracture based on a new family of degradation functions	2018	<i>Journal of the Mechanics and Physics of Solids</i>	3.49	97
1375003	Stable cell-centered finite volume discretization for biot equations	2016	<i>SIAM Journal on Numerical Analysis</i>	3.61	40
1695834	Conforming, non-conforming and non-matching discretization couplings in discrete fracture network simulations	2019	<i>Journal of Computational Physics</i>	4.54	44
995048	Effects of a capillary transition zone on the stability of a diffusive boundary layer	2012	<i>IMA Journal of Applied Mathematics</i>	5.19	46
1722393	Adaptive asynchronous time-stepping, stopping criteria, and a posteriori error estimates for fixed-stress iterative schemes for coupled poromechanics problems	2020	<i>Journal of Computational and Applied Mathematics</i>	5.39	18
1784352	Rigorous upscaling of unsaturated flow in fractured porous media	2020	<i>SIAM Journal on Mathematical Analysis</i>	5.39	18
1467499	Space-time finite element approximation of the Biot poroelasticity system with iterative coupling	2017	<i>Computer Methods in Applied Mechanics and Engineering</i>	5.43	50
1780445	Finite volume discretization for poroelastic media with fractures modeled by contact mechanics	2020	<i>International Journal for Numerical Methods in Engineering</i>	6.26	24
1209811	Cell-centered finite volume discretizations for deformable porous media	2014	<i>International Journal for Numerical Methods in Engineering</i>	6.36	48
1652248	Unified approach to discretization of flow in fractured porous media	2019	<i>Computational Geosciences</i>	6.60	40

1635889	Flow in Fractured Porous Media: A Review of Conceptual Models and Discretization Approaches	2019	<i>Transport in Porous Media</i>	6.88	178
1936825	An accelerated staggered scheme for variational phase-field models of brittle fracture	2021	<i>Computer Methods in Applied Mechanics and Engineering</i>	8.18	14
1832142	Iterative schemes for surfactant transport in porous media	2021	<i>Computational Geosciences</i>	8.64	16
1784326	An iterative staggered scheme for phase field brittle fracture propagation with stabilizing parameters	2020	<i>Computer Methods in Applied Mechanics and Engineering</i>	8.81	22
1562732	A linear domain decomposition method for partially saturated flow in porous media	2018	<i>Computer Methods in Applied Mechanics and Engineering</i>	8.94	33
1832486	Phase field modeling of precipitation and dissolution processes in porous media: Upscaling and numerical experiments	2020	<i>Multiscale Modeling & simulation</i>	8.98	18

In the period 2012-2021, 30 out of 210 papers (14.3%) are classified as “highly cited”; that is, being the top 10% cited works after normalisation of citations for year, publication type and field (Table 3). The share of highly cited papers is also increasing. In the period 2012-2016, the share is 8,7%, while in 2016-2021, it is 18.6%.

5. Citation indicators

The citation indicators for the centre are shown below. Note that the number of publications each year may be slightly different to earlier figures, because here we use publication year according to the citation database (NIB), while earlier we use publication year according to Cristin. There can also be differences between this analysis and other analyses due to differences in data sources, time of data collection, and fractionalisation method. They should therefore be interpreted as an estimate/trend rather than an exact measure.

MNCS = Mean Normalised Citation Score. Citations are normalised according to year of publication, type of article (e.g. review), and subject field. The resulting values are scaled with a factor 100. A value of 100 means cited at the world average for similar publications. This value can be strongly affected by a few very highly/lowly cited publications.

The “10th percentile” measures look at the fraction of the PMGs papers that are in the top 10 percent cited (after this normalisation) – this is less susceptible to outliers.

For each measure there is a whole counting method (MNCS and proportion of papers in top 10 percent cited), and a fractional counting method which tries to account somewhat for author involvement from the institution (MNCS fractional and proportion of author shares in top 10 percent cited). “MNCS Fractional” uses the calculation (where A and B are two publications): $((MNCS_A * authorshares_A) + (MNCS_B * authorshares_B) + ...) / (authorshares_A + authorshares_B + ...) * 100$

PMG gets higher results for the two fractional measures – but we usually see the opposite (“whole counts” of publications give higher results). It means that the papers where there is a relatively high share of PMG co-authors are cited comparatively more often.

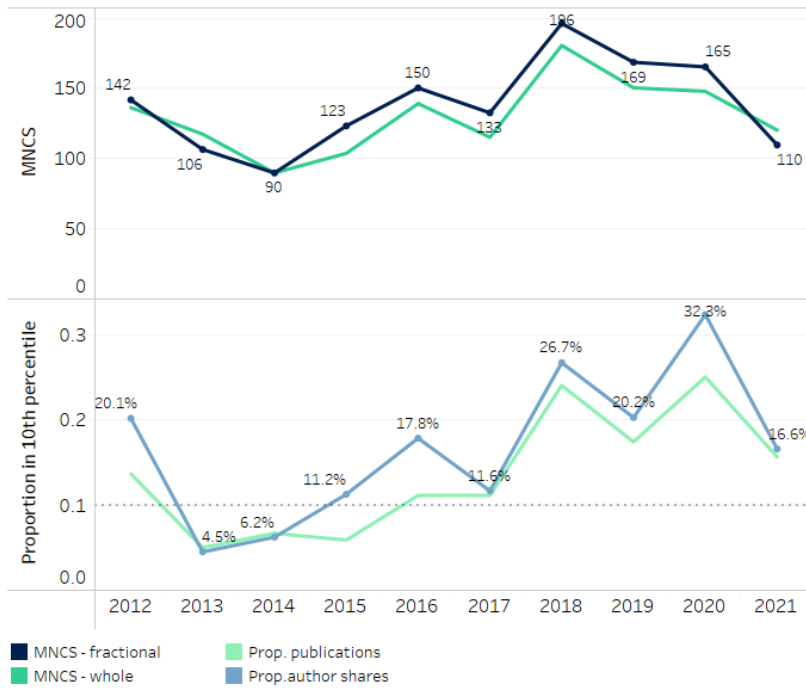


Figure 5 Citation indicators for PMG publications.

Table 4 Citation indicators for PMG publications. "Prop. Publications" and "Prop. Author shares" refer to percentage of the PMGs publications/author shares in the top 10 percent cited publications.

	No. publications	Author shares UiB	Avg. no. citations	MNCS - whole counts	Prop. publications	MNCS - fractional	Prop. author shares
2012	22	7.86	39	136	13.6%	142	20.1%
2013	20	11.13	23	117	5.0%	106	4.5%
2014	15	8.04	16	90	6.7%	90	6.2%
2015	17	6.67	22	104	5.9%	123	11.2%
2016	18	8.42	28	139	11.1%	150	17.8%
2017	18	10.59	16	115	11.1%	133	11.6%
2018	25	14.72	23	181	24.0%	196	26.7%
2019	23	14.41	22	150	17.4%	169	20.2%
2020	20	8.98	11	148	25.0%	165	32.3%
2021	32	17.85	7	120	15.6%	110	16.6%

The average MNCS per publication is 130, increasing from 119 in the period 2012-2016 to 143 in the period 2017-2021.