Steven A Benner

List of Publications by Year
in descending order

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136 papers	10,059 citations	43973 48 h-index	37111 96 g-index
144 all docs	144 docs citations	144 times ranked	6420 citing authors

#	Article	IF	Citations
1	Synthetic biology. Nature Reviews Genetics, 2005, 6, 533-543.	7.7	736
2	Enzymatic incorporation of a new base pair into DNA and RNA extends the genetic alphabet. Nature, 1990, 343, 33-37.	13.7	645
3	Understanding Nucleic Acids Using Synthetic Chemistry. Accounts of Chemical Research, 2004, 37, 784-797.	7.6	366
4	Enzymatic incorporation of a new base pair into DNA and RNA. Journal of the American Chemical Society, 1989, 111, 8322-8323.	6.6	341
5	Hachimoji DNA and RNA: A genetic system with eight building blocks. Science, 2019, 363, 884-887.	6.0	337
6	Is there a common chemical model for life in the universe?. Current Opinion in Chemical Biology, 2004, 8, 672-689.	2.8	330
7	Ribosome-mediated incorporation of a non-standard amino acid into a peptide through expansion of the genetic code. Nature, 1992, 356, 537-539.	13.7	283
8	In vitro selection with artificial expanded genetic information systems. Proceedings of the National Academy of Sciences of the United States of America, 2014, 111, 1449-1454.	3.3	279
9	Reconstructing the evolutionary history of the artiodactyl ribonuclease superfamily. Nature, 1995, 374, 57-59.	13.7	265
10	Enzymic recognition of the base pair between isocytidine and isoguanosine. Biochemistry, 1993, 32, 10489-10496.	1.2	251
11	Amplification, Mutation, and Sequencing of a Six-Letter Synthetic Genetic System. Journal of the American Chemical Society, 2011, 133, 15105-15112.	6.6	243
12	Synthesis, structure and activity of artificial, rationally designed catalytic polypeptides. Nature, 1993, 365, 530-532.	13.7	242
13	Defining Life. Astrobiology, 2010, 10, 1021-1030.	1.5	229
14	Inferring the palaeoenvironment of ancient bacteria on the basis of resurrected proteins. Nature, 2003, 425, 285-288.	13.7	227
15	Asphalt, Water, and the Prebiotic Synthesis of Ribose, Ribonucleosides, and RNA. Accounts of Chemical Research, 2012, 45, 2025-2034.	7.6	210
16	Synthesis of Carbohydrates in Mineral-Guided Prebiotic Cycles. Journal of the American Chemical Society, 2011, 133, 9457-9468.	6.6	202
17	Locked Nucleic Acid Molecular Beacons. Journal of the American Chemical Society, 2005, 127, 15664-15665.	6.6	198
18	Evolution of Functional Six-Nucleotide DNA. Journal of the American Chemical Society, 2015, 137, 6734-6737.	6.6	185

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19	Artificially expanded genetic information system: a new base pair with an alternative hydrogen bonding pattern. Nucleic Acids Research, 2006, 34, 6095-6101.	6.5	172
20	The â€œStrongâ€•RNA World Hypothesis: Fifty Years Old. Astrobiology, 2013, 13, 391-403.	1.5	170
21	Enzymatic incorporation of a third nucleobase pair. Nucleic Acids Research, 2007, 35, 4238-4249.	6.5	155
22	Nucleobase Pairing in Expanded Watson-Crick-like Genetic Information Systems. Structure, 2003, 11, 1485-1498.	1.6	146
23	Point of sampling detection of Zika virus within a multiplexed kit capable of detecting dengue and chikungunya. BMC Infectious Diseases, 2017, 17, 293.	1.3	130
24	The ribonuclease from an extinct bovid ruminant. FEBS Letters, 1990, 262, 104-106.	1.3	115
25	Quantitative Analysis of Receptors for Adenosine Nucleotides Obtained via In Vitro Selection from a Library Incorporating a Cationic Nucleotide Analog. Journal of the American Chemical Society, 1999, 121, 9781-9789.	6.6	115
26	Phosphates, DNA, and the Search for Nonterrean Life: A Second Generation Model for Genetic Molecules. Bioorganic Chemistry, 2002, 30, 62-80.	2.0	110
27	Expanded Genetic Alphabets in the Polymerase Chain Reaction. Angewandte Chemie - International Edition, 2010, 49, 177-180.	7.2	107
28	Planetary Biology–Paleontological, Geological, and Molecular Histories of Life. Science, 2002, 296, 864-868.	6.0	105
29	Structural Basis for a Six Nucleotide Genetic Alphabet. Journal of the American Chemical Society, 2015, 137, 6947-6955.	6.6	102
30	Hominids adapted to metabolize ethanol long before human-directed fermentation. Proceedings of the National Academy of Sciences of the United States of America, 2015, 112, 458-463.	3.3	96
31	Alternative Watsonâ€“Crick Synthetic Genetic Systems. Cold Spring Harbor Perspectives in Biology, 2016, 8, a023770.	2.3	83
32	PCR amplification of DNA containing non-standard base pairs by variants of reverse transcriptase from Human Immunodeficiency Virus-1. Nucleic Acids Research, 2004, 32, 728-735.	6.5	81
33	Aptamers against Cells Overexpressing Glypicanâ€…3 from Expanded Genetic Systems Combined with Cell Engineering and Laboratory Evolution. Angewandte Chemie - International Edition, 2016, 55, 12372-12375.	7.2	78
34	Synthetic biology: Act natural. Nature, 2003, 421, 118-118.	13.7	77
35	Evaporite Borateâ€Containing Mineral Ensembles Make Phosphate Available and Regiospecifically Phosphorylate Ribonucleosides: Borate as a Multifaceted Problem Solver in Prebiotic Chemistry. Angewandte Chemie - International Edition, 2016, 55, 15816-15820.	7.2	76
36	When Did Life Likely Emerge on Earth in an RNAâ€First Process?. ChemSystemsChem, 2020, 2, e1900035.	1.1	71

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37	Expanding the Genetic Alphabet:Â Non-Epimerizing Nucleoside with thepyDDA Hydrogen-Bonding Pattern. Journal of Organic Chemistry, 2003, 68, 9839-9842.	1.7	63
38	Laboratory evolution of artificially expanded DNA gives redesignable aptamers that target the toxic form of anthrax protective antigen. Nucleic Acids Research, 2016, 44, gkw890.	6.5	63
39	An Aptamerâ€Nanotrain Assembled from Sixâ€Letter DNA Delivers Doxorubicin Selectively to Liver Cancer Cells. Angewandte Chemie - International Edition, 2020, 59, 663-668.	7.2	61
40	Functional inferences from reconstructed evolutionary biology involving rectified databases â€“ an evolutionarily grounded approach to functional genomics. Research in Microbiology, 2000, 151, 97-106.	1.0	58
41	A Direct Route to 3-(D-Ribofuranosyl)pyridine Nucleosides. Helvetica Chimica Acta, 1991, 74, 397-406.	1.0	57
42	pH-Independent Triple Helix Formation by an Oligonucleotide Containing a Pyrazine Donor-Donor-Acceptor Base. Journal of the American Chemical Society, 1995, 117, 5361-5362.	6.6	57
43	Directed Evolution of Polymerases To Accept Nucleotides with Nonstandard Hydrogen Bond Patterns. Biochemistry, 2013, 52, 5288-5294.	1.2	56
44	Artificially Expanded Genetic Information Systems for New Aptamer Technologies. Biomedicines, 2018, 6, 53.	1.4	55
45	Multiplexed Genetic Analysis Using an Expanded Genetic Alphabet. Clinical Chemistry, 2004, 50, 2019-2027.	1.5	53
46	Synthetic biology, tinkering biology, and artificial biology. What are we learning?. Comptes Rendus Chimie, 2011, 14, 372-387.	0.2	53
47	The past as the key to the present: Resurrection of ancient proteins from eosinophils. Proceedings of the National Academy of Sciences of the United States of America, 2002, 99, 4760-4761.	3.3	51
48	DNA polymerases engineered by directed evolution to incorporate non-standard nucleotides. Frontiers in Microbiology, 2014, 5, 565.	1.5	51
49	Nonstandard Hydrogen Bonding in Duplex Oligonucleotides. The Base Pair between an Acceptor-Donor-Donor Pyrimidine Analog and a Donor-Acceptor-Acceptor Purine Analog. Journal of the American Chemical Society, 1994, 116, 6929-6930.	6.6	50
50	Assessing enzyme substrate specificity using combinatorial libraries and electrospray ionization-Fourier transform ion cyclotron resonance mass spectrometry. Rapid Communications in Mass Spectrometry, 1997, 11, 1749-1752.	0.7	50
51	High-throughput multiplexed xMAP Luminex array panel for detection of twenty two medically important mosquito-borne arboviruses based on innovations in synthetic biology. Journal of Virological Methods, 2015, 214, 60-74.	1.0	50
52	Bona Fide Predictions of Protein Secondary Structure Using Transparent Analyses of Multiple Sequence Alignments. Chemical Reviews, 1997, 97, 2725-2844.	23.0	47
53	Setting the Stage: The History, Chemistry, and Geobiology behind RNA. Cold Spring Harbor Perspectives in Biology, 2012, 4, a003541-a003541.	2.3	47
54	Transcription, Reverse Transcription, and Analysis of RNA Containing Artificial Genetic Components. ACS Synthetic Biology, 2015, 4, 407-413.	1.9	46

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55	Paradoxes in the Origin of Life. Origins of Life and Evolution of Biospheres, 2014, 44, 339-343.	0.8	44
56	Site-directed mutagenesis of bovine pancreatic ribonuclease: Lysine-41 and aspartate-121. FEBS Letters, 1991, 281, 275-277.	1.3	43
57	Artificial Genetic Systems:â€‰ Exploiting the â€œAromaticityâ€•Formalism To Improve the Tautomeric Ratio for Isoguanosine Derivatives. Journal of Organic Chemistry, 2004, 69, 3972-3975.	1.7	42
58	Quantitative Analysis of a RNA-Cleaving DNA Catalyst Obtained via in Vitro Selectionâ€. Biochemistry, 2004, 43, 11446-11459.	1.2	41
59	2-Hydroxymethylboronate as a Reagent To Detect Carbohydrates:â€‰ Application to the Analysis of the Formose Reaction. Journal of Organic Chemistry, 2006, 71, 9503-9505.	1.7	40
60	Detecting Darwinism from Molecules in the Enceladus Plumes, Jupiter's Moons, and Other Planetary Water Lagoons. Astrobiology, 2017, 17, 840-851.	1.5	39
61	CHEMISTRY: Enhanced: Redesigning Genetics. Science, 2004, 306, 625-626.	6.0	38
62	Artificial Genetic Systems: Selfâ€Avoiding DNA in PCR and Multiplexed PCR. Angewandte Chemie - International Edition, 2010, 49, 5554-5557.	7.2	38
63	â€œSkinnyâ€•and â€œFatâ€•DNA: Two New Double Helices. Journal of the American Chemical Society, 2018, 140, 11655-11660.	6.6	36
64	Design of a novel molecular beacon: modification of the stem with artificially genetic alphabet. Chemical Communications, 2008, , 5128.	2.2	35
65	Comment on â€œA Bacterium That Can Grow by Using Arsenic Instead of Phosphorusâ€• Science, 2011, 332, 1149-1149.	6.0	35
66	Recognition of a non-standard base pair by thermostable DNA polymerases. Bioorganic and Medicinal Chemistry Letters, 1998, 8, 1149-1152.	1.0	34
67	Confluence of theory and experiment reveals the catalytic mechanism of the Varkud satellite ribozyme. Nature Chemistry, 2020, 12, 193-201.	6.6	33
68	Correct structure prediction?. Nature, 1992, 359, 781-781.	13.7	32
69	Fluorescent Charge-Neutral Analogue of Xanthosine:Â Synthesis of a 2â€˜-Deoxyribonucleoside Bearing a 5-Aza-7-deazaxanthine Base. Journal of Organic Chemistry, 2001, 66, 5012-5015.	1.7	31
70	Labeled Nucleoside Triphosphates with Reversibly Terminating Aminoalkoxyl Groups. Nucleosides, Nucleotides and Nucleic Acids, 2010, 29, 879-895.	0.4	31
71	The nitrogenase MoFe protein. FEBS Letters, 1993, 318, 118-124.	1.3	30
72	Synthesis of Oligonucleotides Containing 2?-Deoxyisoguanosine and 2?-Deoxy-5-methylisocytidine Using Phosphoramidite Chemistry. Helvetica Chimica Acta, 1998, 81, 793-811.	1.0	30

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73	Probing minor groove recognition contacts by DNA polymerases and reverse transcriptases using 3-deaza-2'-deoxyadenosine. Nucleic Acids Research, 2004, 32, 2241-2250.	6.5	30
74	Comment on â€œThe Silicate-Mediated Formose Reaction: Bottom-Up Synthesis of Sugar Silicatesâ€. Science, 2010, 329, 902-902.	6.0	29
75	RecombinaseâEBased Isothermal Amplification of Nucleic Acids with Selfâ€Avoiding Molecular Recognition Systems (SAMRS). ChemBioChem, 2014, 15, 2268-2274.	1.3	29
76	Prebiotic Chemistry that Could Not Not Have Happened. Life, 2019, 9, 84.	1.1	29
77	Catalytic Synthesis of Polyribonucleic Acid on Prebiotic Rock Glasses. Astrobiology, 2022, 22, 629-636.	1.5	28
78	Recognition of an expanded genetic alphabet by type-II restriction endonucleases and their application to analyze polymerase fidelity. Nucleic Acids Research, 2011, 39, 3949-3961.	6.5	27
79	Ribonucleosides for an Artificially Expanded Genetic Information System. Journal of Organic Chemistry, 2014, 79, 3194-3199.	1.7	25
80	A Direct Prebiotic Synthesis of Nicotinamide Nucleotide. Chemistry - A European Journal, 2018, 24, 581-584.	1.7	25
81	2â€²-Deoxy-1-methylpseudocytidine, a stable analog of 2â€²-deoxy-5-methylisocytidine. Bioorganic and Medicinal Chemistry, 2009, 17, 3728-3732.	1.4	24
82	Predicting the conformation of proteins man versus machine. FEBS Letters, 1993, 325, 29-33.	1.3	23
83	Autonomous assembly of synthetic oligonucleotides built from an expanded DNA alphabet. Total synthesis of a gene encoding kanamycin resistance. Beilstein Journal of Organic Chemistry, 2014, 10, 2348-2360.	1.3	23
84	Synthesis and Characterization of Non-standard Nucleosides and Nucleotides Bearing the Acceptor-Donor-Donor Pyrimidine Analog 6-Amino-3-methylpyrazin-2(1H)-one. Helvetica Chimica Acta, 1996, 79, 1863-1880.	1.0	22
85	Evolutionary history of the uterine serpins. The Journal of Experimental Zoology, 2000, 288, 165-174.	1.4	22
86	Tautomeric Equilibria of Nucleobases in the Hachimoji Expanded Genetic Alphabet. Journal of Chemical Theory and Computation, 2020, 16, 2766-2777.	2.3	22
87	A predicted consensus structure for the N-Terminal fragment of the heat shock protein HSP90 family. , 1997, 27, 450-458.		21
88	Biophysics of Artificially Expanded Genetic Information Systems. Thermodynamics of DNA Duplexes Containing Matches and Mismatches Involving 2-Amino-3-nitropyridin-6-one (Z) and Imidazo[1,2-a]-1,3,5-triazin-4(8H)one (P). ACS Synthetic Biology, 2017, 6, 782-792.	1.9	21
89	Abiotic Synthesis of Nucleoside 5â€²-Triphosphates with Nickel Borate and Cyclic Trimetaphosphate (CTMP). Astrobiology, 2021, 21, 298-306.	1.5	21
90	Interferon-Î³ activates the cleavage of double-stranded RNA by bovine seminal ribonuclease. FEBS Letters, 1990, 270, 229-232.	1.3	20

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91	Helicaseâ€Dependent Isothermal Amplification of DNA and RNA by Using Selfâ€Avoiding Molecular Recognition Systems. ChemBioChem, 2015, 16, 1365-1370.	1.3	20
92	Detecting respiratory viral RNA using expanded genetic alphabets and self-avoiding DNA. Analytical Biochemistry, 2015, 489, 62-72.	1.1	20
93	Interpretive proteomicsâ€"finding biological meaning in genome and proteome databases. Advances in Enzyme Regulation, 2003, 43, 271-359.	2.9	19
94	A Crystal Structure of a Functional RNA Molecule Containing an Artificial Nucleobase Pair. Angewandte Chemie - International Edition, 2015, 54, 9853-9856.	7.2	18
95	The challenge of synthetic biology. Synthetic Darwinism and the aperiodic crystal structure. Current Opinion in Chemical Biology, 2018, 46, 188-195.	2.8	18
96	Snapshots of an evolved DNA polymerase pre- and post-incorporation of an unnatural nucleotide. Nucleic Acids Research, 2018, 46, 7977-7988.	6.5	18
97	Building better polymerases: Engineering the replication of expanded genetic alphabets. Journal of Biological Chemistry, 2020, 295, 17046-17059.	1.6	16
98	Stereospecificity in Enzymology: Its Place in Evolution. Topics in Stereochemistry, 2007, , 127-207.	2.0	15
99	Assays To Detect the Formation of Triphosphates of Unnatural Nucleotides: Application to Escherichia coli Nucleoside Diphosphate Kinase. ACS Synthetic Biology, 2016, 5, 234-240.	1.9	15
100	Synthesis as a Route to Knowledge. Biological Theory, 2013, 8, 357-367.	0.8	14
101	When Did Life Likely Emerge on Earth in an RNAâ€First Process?. ChemSystemsChem, 2020, 2, e2000009.	1.1	14
102	Ultra-rapid detection of SARS-CoV-2 in public workspace environments. PLoS ONE, 2021, 16, e0240524.	1.1	13
103	A norovirus detection architecture based on isothermal amplification and expanded genetic systems. Journal of Virological Methods, 2016, 237, 64-71.	1.0	12
104	Molybdenum(VI)-Catalyzed Rearrangement of Prebiotic Carbohydrates in Formamide, a Candidate Prebiotic Solvent. Astrobiology, 2018, 18, 1159-1170.	1.5	11
105	Polymerase Interactions with Wobble Mismatches in Synthetic Genetic Systems and Their Evolutionary Implications. Biochemistry, 2016, 55, 3847-3850.	1.2	10
106	Standard and AEGIS nicking molecular beacons detect amplicons from the Middle East respiratory syndrome coronavirus. Journal of Virological Methods, 2016, 236, 54-61.	1.0	10
107	Structure and Biophysics for a Six Letter DNA Alphabet that Includes Imidazo[1,2-a]-1,3,5-triazine-2(8H)-4(3H)-dione (X) and 2,4-Diaminopyrimidine (K). ACS Synthetic Biology, 2017, 6, 2118-2129.	1.9	10
108	Expanded Genetic Alphabets: Managing Nucleotides That Lack Tautomeric, Protonated, or Deprotonated Versions Complementary to Natural Nucleotides. ACS Synthetic Biology, 2017, 6, 194-200.	1.9	10

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109	Eliminating primer dimers and improving SNP detection using self-avoiding molecular recognition systems. Biology Methods and Protocols, 2020, 5, bpaa004.	1.0	10
110	Aptamers against Cells Overexpressing Glypicanâ€...3 from Expanded Genetic Systems Combined with Cell Engineering and Laboratory Evolution. Angewandte Chemie, 2016, 128, 12560-12563.	1.6	9
111	Detection of chikungunya viral RNA in mosquito bodies on cationic (Q) paper based on innovations in synthetic biology. Journal of Virological Methods, 2017, 246, 104-111.	1.0	9
112	Crystal structure of a hybrid between ribonuclease A and bovine seminal ribonuclease - the basic surface, at 2.0 A resolution. FEBS Journal, 1999, 260, 176-182.	0.2	8
113	Synthetic biology with artificially expanded genetic information systems. From personalized medicine to extraterrestrial life. Nucleic Acids Symposium Series, 2003, 3, 125-126.	0.3	8
114	Unusual Hydrogen Bonding Patterns and the Role of the Backbone in Nucleic Acid Information Transfer. ACS Central Science, 2016, 2, 882-884.	5.3	8
115	Uniting Natural History with the Molecular Sciences. The Ultimate Multidisciplinarity. Accounts of Chemical Research, 2017, 50, 498-502.	7.6	8
116	A Single Deoxynucleoside Kinase Variant from Drosophila melanogaster Synthesizes Monophosphates of Nucleosides That Are Components of an Expanded Genetic System. ACS Synthetic Biology, 2017, 6, 388-394.	1.9	8
117	Multiplexed Isothermal Amplification Based Diagnostic Platform to Detect Zika, Chikungunya, and Dengue 1. Journal of Visualized Experiments, 2018, , .	0.2	8
118	An Aptamerâ€Nanotrain Assembled from Sixâ€Letter DNA Delivers Doxorubicin Selectively to Liver Cancer Cells. Angewandte Chemie, 2020, 132, 673-678.	1.6	8
119	Planetary Systems Biology. Molecular Cell, 2005, 17, 471-472.	4.5	7
120	Prebiotic plausibility and networks of paradox-resolving independent models. Nature Communications, 2018, 9, 5173.	5.8	7
121	Optimization of cationic (Q)-paper for detection of arboviruses in infected mosquitoes. Journal of Virological Methods, 2018, 261, 71-79.	1.0	7
122	Biological phosphorylation of an Unnatural Base Pair (UBP) using a Drosophila melanogaster deoxynucleoside kinase (DmdNK) mutant. PLoS ONE, 2017, 12, e0174163.	1.1	7
123	OligArch: A software tool to allow artificially expanded genetic information systems (AEGIS) to guide the autonomous self-assembly of long DNA constructs from multiple DNA single strands. Beilstein Journal of Organic Chemistry, 2014, 10, 1826-1833.	1.3	6
124	Synthetic Biology for Improved Personalized Medicine. Nucleic Acids Symposium Series, 2008, 52, 243-244.	0.3	5
125	Mineral-Organic Interactions in Prebiotic Synthesis. Nucleic Acids and Molecular Biology, 2018, , 31-83.	0.2	5
126	Determination of the Absolute Configuration of Dimethyl (2S,3S)-2-Allyl-3-hydroxyglutarate: A Chiral Building Block for Preparing Branched-Chain Nucleoside Analogues. Helvetica Chimica Acta, 1993, 76, 2969-2975.	1.0	4

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127	A predicted consensus structure for the C terminus of the beta and gamma chains of fibrinogen. , 1997, 27, 279-289.		4
128	Q&A: Life, synthetic biology and risk. BMC Biology, 2010, 8, 77.	1.7	4
129	Nucleoside analogs to manage sequence divergence in nucleic acid amplification and SNP detection. Nucleic Acids Research, 2018, 46, 5902-5910.	6.5	4
130	Electrochemical reduction and oxidation of eight unnatural 2â€²-deoxynucleosides at a pyrolytic graphite electrode. Electrochimica Acta, 2020, 362, 137210.	2.6	4
131	Engineered DNA Polymerases. Nucleic Acids and Molecular Biology, 2014, , 163-187.	0.2	3
132	Agnostic Life Finder (ALF) for Large-Scale Screening of Martian Life During In Situ Refueling. Astrobiology, 2022, 22, 1255-1263.	1.5	3
133	Next-generation DNA in pathogen detection, surveillance, and CLIA-waivable diagnostics. , 2015, , .		2
134	EVOLUTION-BASED GENOME ANALYSIS: AN ALTERNATIVE TO ANALYZE FOLDING AND FUNCTION IN PROTEINS. , 2004, , .		0
135	Protein Structure Prediction. Science, 1996, 274, 1448-1449.	6.0	0
136	Fluorinated oil-surfactant mixtures with the density of water: Artificial cells for synthetic biology. PLoS ONE, 2022, 17, e0252361.	1.1	0