

Frances H Arnold

List of Publications by Citations

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302
papers

30,548
citations

96
h-index

165
g-index

334
ext. papers

34,703
ext. citations

12.2
avg, IF

7.93
L-index

#	Paper	IF	Citations
302	Dynamic pattern formation in a vesicle-generating microfluidic device. <i>Physical Review Letters</i> , 2001 , 86, 4163-6	7.4	1544
301	Protein stability promotes evolvability. <i>Proceedings of the National Academy of Sciences of the United States of America</i> , 2006 , 103, 5869-74	11.5	812
300	A microfabricated fluorescence-activated cell sorter. <i>Nature Biotechnology</i> , 1999 , 17, 1109-11	44.5	698
299	Engineering microbial consortia: a new frontier in synthetic biology. <i>Trends in Biotechnology</i> , 2008 , 26, 483-9	15.1	657
298	Exploring protein fitness landscapes by directed evolution. <i>Nature Reviews Molecular Cell Biology</i> , 2009 , 10, 866-76	48.7	653
297	Molecular evolution by staggered extension process (StEP) in vitro recombination. <i>Nature Biotechnology</i> , 1998 , 16, 258-61	44.5	605
296	Olefin cyclopropanation via carbene transfer catalyzed by engineered cytochrome P450 enzymes. <i>Science</i> , 2013 , 339, 307-10	33.3	556
295	Directed Evolution: Bringing New Chemistry to Life. <i>Angewandte Chemie - International Edition</i> , 2018 , 57, 4143-4148	16.4	470
294	Design by Directed Evolution. <i>Accounts of Chemical Research</i> , 1998 , 31, 125-131	24.3	459
293	Laboratory evolution of peroxide-mediated cytochrome P450 hydroxylation. <i>Nature</i> , 1999 , 399, 670-3	50.4	381
292	Directed evolution of a para-nitrobenzyl esterase for aqueous-organic solvents. <i>Nature Biotechnology</i> , 1996 , 14, 458-67	44.5	358
291	Directed evolution of a genetic circuit. <i>Proceedings of the National Academy of Sciences of the United States of America</i> , 2002 , 99, 16587-91	11.5	352
290	Directed evolution of cytochrome c for carbon-silicon bond formation: Bringing silicon to life. <i>Science</i> , 2016 , 354, 1048-1051	33.3	345
289	A synthetic Escherichia coli predator-prey ecosystem. <i>Molecular Systems Biology</i> , 2008 , 4, 187	12.2	344
288	Combinatorial and computational challenges for biocatalyst design. <i>Nature</i> , 2001 , 409, 253-7	50.4	340
287	Laboratory evolution of a soluble, self-sufficient, highly active alkane hydroxylase. <i>Nature Biotechnology</i> , 2002 , 20, 1135-9	44.5	338
286	Expanding the enzyme universe: accessing non-natural reactions by mechanism-guided directed evolution. <i>Angewandte Chemie - International Edition</i> , 2015 , 54, 3351-67	16.4	334

285	Metal-affinity separations: a new dimension in protein processing. <i>Nature Biotechnology</i> , 1991 , 9, 151-6	44.5	314
284	How enzymes adapt: lessons from directed evolution. <i>Trends in Biochemical Sciences</i> , 2001 , 26, 100-6	10.3	306
283	Directed evolution of biocatalysts. <i>Current Opinion in Chemical Biology</i> , 1999 , 3, 54-9	9.7	295
282	Inverting enantioselectivity by directed evolution of hydantoinase for improved production of L-methionine. <i>Nature Biotechnology</i> , 2000 , 18, 317-20	44.5	287
281	Molecular breeding of carotenoid biosynthetic pathways. <i>Nature Biotechnology</i> , 2000 , 18, 750-3	44.5	285
280	Regio- and enantioselective alkane hydroxylation with engineered cytochromes P450 BM-3. <i>Journal of the American Chemical Society</i> , 2003 , 125, 13442-50	16.4	282
279	Thermodynamic prediction of protein neutrality. <i>Proceedings of the National Academy of Sciences of the United States of America</i> , 2005 , 102, 606-11	11.5	272
278	Directed evolution of enzyme catalysts. <i>Trends in Biotechnology</i> , 1997 , 15, 523-30	15.1	267
277	Enzymatic functionalization of carbon-hydrogen bonds. <i>Chemical Society Reviews</i> , 2011 , 40, 2003-21	58.5	257
276	Machine-learning-guided directed evolution for protein engineering. <i>Nature Methods</i> , 2019 , 16, 687-694	21.6	255
275	Directed enzyme evolution: climbing fitness peaks one amino acid at a time. <i>Current Opinion in Chemical Biology</i> , 2009 , 13, 3-9	9.7	249
274	A serine-substituted P450 catalyzes highly efficient carbene transfer to olefins in vivo. <i>Nature Chemical Biology</i> , 2013 , 9, 485-7	11.7	244
273	Directed evolution converts subtilisin E into a functional equivalent of thermitase. <i>Protein Engineering, Design and Selection</i> , 1999 , 12, 47-53	1.9	241
272	Enantioselective, intermolecular benzylic C-H amination catalysed by an engineered iron-haem enzyme. <i>Nature Chemistry</i> , 2017 , 9, 629-634	17.6	239
271	Functional expression of a fungal laccase in <i>Saccharomyces cerevisiae</i> by directed evolution. <i>Applied and Environmental Microbiology</i> , 2003 , 69, 987-95	4.8	238
270	Engineering new catalytic activities in enzymes. <i>Nature Catalysis</i> , 2020 , 3, 203-213	36.5	230
269	Cytochrome P450: taming a wild type enzyme. <i>Current Opinion in Biotechnology</i> , 2011 , 22, 809-17	11.4	223
268	Directed enzyme evolution. <i>Current Opinion in Biotechnology</i> , 2001 , 12, 545-51	11.4	222

267	Directed evolution study of temperature adaptation in a psychrophilic enzyme. <i>Journal of Molecular Biology</i> , 2000 , 297, 1015-26	6.5	219
266	A family of thermostable fungal cellulases created by structure-guided recombination. <i>Proceedings of the National Academy of Sciences of the United States of America</i> , 2009 , 106, 5610-5	11.5	218
265	Libraries of hybrid proteins from distantly related sequences. <i>Nature Biotechnology</i> , 2001 , 19, 456-60	44.5	212
264	Enantioselective intramolecular C-H amination catalyzed by engineered cytochrome P450 enzymes in vitro and in vivo. <i>Angewandte Chemie - International Edition</i> , 2013 , 52, 9309-12	16.4	203
263	Engineered metal-binding proteins: purification to protein folding. <i>Science</i> , 1991 , 252, 1796-7	33.3	201
262	Engineered alkane-hydroxylating cytochrome P450(BM3) exhibiting natively like catalytic properties. <i>Angewandte Chemie - International Edition</i> , 2007 , 46, 8414-8	16.4	191
261	Directed evolution of subtilisin E in <i>Bacillus subtilis</i> to enhance total activity in aqueous dimethylformamide. <i>Protein Engineering, Design and Selection</i> , 1996 , 9, 77-83	1.9	188
260	Machine learning-assisted directed protein evolution with combinatorial libraries. <i>Proceedings of the National Academy of Sciences of the United States of America</i> , 2019 , 116, 8852-8858	11.5	183
259	Exploiting and engineering hemoproteins for abiological carbene and nitrene transfer reactions. <i>Current Opinion in Biotechnology</i> , 2017 , 47, 102-111	11.4	180
258	A self-sufficient peroxide-driven hydroxylation biocatalyst. <i>Angewandte Chemie - International Edition</i> , 2003 , 42, 3299-301	16.4	177
257	Innovation by Evolution: Bringing New Chemistry to Life (Nobel Lecture). <i>Angewandte Chemie - International Edition</i> , 2019 , 58, 14420-14426	16.4	174
256	Synthesis of bioactive protein hydrogels by genetically encoded SpyTag-SpyCatcher chemistry. <i>Proceedings of the National Academy of Sciences of the United States of America</i> , 2014 , 111, 11269-74	11.5	174
255	Protein building blocks preserved by recombination. <i>Nature Structural Biology</i> , 2002 , 9, 553-8		173
254	Genetically programmed chiral organoborane synthesis. <i>Nature</i> , 2017 , 552, 132-136	50.4	170
253	Evolutionary history of a specialized p450 propane monooxygenase. <i>Journal of Molecular Biology</i> , 2008 , 383, 1069-80	6.5	168
252	Diversifying carotenoid biosynthetic pathways by directed evolution. <i>Microbiology and Molecular Biology Reviews</i> , 2005 , 69, 51-78	13.2	158
251	Dual selection enhances the signaling specificity of a variant of the quorum-sensing transcriptional activator LuxR. <i>Nature Biotechnology</i> , 2006 , 24, 708-12	44.5	156
250	Exploring nonnatural evolutionary pathways by saturation mutagenesis: rapid improvement of protein function. <i>Journal of Molecular Evolution</i> , 1999 , 49, 716-20	3.1	156

249	Navigating the protein fitness landscape with Gaussian processes. <i>Proceedings of the National Academy of Sciences of the United States of America</i> , 2013 , 110, E193-201	11.5	153
248	Improved cyclopropanation activity of histidine-ligated cytochrome P450 enables the enantioselective formal synthesis of levomilnacipran. <i>Angewandte Chemie - International Edition</i> , 2014 , 53, 6810-3	16.4	146
247	Enzymatic assembly of carbon-carbon bonds via iron-catalysed sp C-H functionalization. <i>Nature</i> , 2019 , 565, 67-72	50.4	145
246	Enzyme engineering for nonaqueous solvents: random mutagenesis to enhance activity of subtilisin E in polar organic media. <i>Bio/technology</i> , 1991 , 9, 1073-7		143
245	Metal-Induced Dispersion of Lipid Aggregates: A Simple, Selective, and Sensitive Fluorescent Metal Ion Sensor. <i>Angewandte Chemie International Edition in English</i> , 1995 , 34, 905-907		139
244	Cytochrome P450-Catalyzed Insertion of Carbenoids into N-H Bonds. <i>Chemical Science</i> , 2014 , 5, 598-601	9.4	137
243	Metal-coordination interactions in the template-mediated synthesis of substrate-selective polymers: recognition of bis(imidazole) substrates by copper(II) iminodiacetate containing polymers. <i>Macromolecules</i> , 1992 , 25, 7051-7059	5.5	137
242	Analysis of affinity separations. <i>The Chemical Engineering Journal</i> , 1985 , 30, B9-B23		135
241	Enzymatic construction of highly strained carbocycles. <i>Science</i> , 2018 , 360, 71-75	33.3	134
240	Strategies for the in vitro evolution of protein function: enzyme evolution by random recombination of improved sequences. <i>Journal of Molecular Biology</i> , 1997 , 272, 336-47	6.5	134
239	Preparation of human metabolites of propranolol using laboratory-evolved bacterial cytochromes P450. <i>Biotechnology and Bioengineering</i> , 2006 , 93, 494-9	4.9	131
238	Enantioselective alpha-hydroxylation of 2-arylacetic acid derivatives and buspirone catalyzed by engineered cytochrome P450 BM-3. <i>Journal of the American Chemical Society</i> , 2006 , 128, 6058-9	16.4	130
237	Direct conversion of ethane to ethanol by engineered cytochrome P450 BM3. <i>ChemBioChem</i> , 2005 , 6, 1765-8	3.8	128
236	Engineering enzymes for non-aqueous solvents. <i>Trends in Biotechnology</i> , 1990 , 8, 244-9	15.1	127
235	Neutral genetic drift can alter promiscuous protein functions, potentially aiding functional evolution. <i>Biology Direct</i> , 2007 , 2, 17	7.2	125
234	Functional expression and stabilization of horseradish peroxidase by directed evolution in <i>Saccharomyces cerevisiae</i> . <i>Biotechnology and Bioengineering</i> , 2001 , 76, 99-107	4.9	125
233	A diverse family of thermostable cytochrome P450s created by recombination of stabilizing fragments. <i>Nature Biotechnology</i> , 2007 , 25, 1051-6	44.5	124
232	Enantioselective Enzyme-Catalyzed Aziridination Enabled by Active-Site Evolution of a Cytochrome P450. <i>ACS Central Science</i> , 2015 , 1, 89-93	16.8	122

231	Enzyme-controlled nitrogen-atom transfer enables regiodivergent C-H amination. <i>Journal of the American Chemical Society</i> , 2014 , 136, 15505-8	16.4	122
230	The Temkin isotherm describes heterogeneous protein adsorption. <i>BBA - Proteins and Proteomics</i> , 1995 , 1247, 293-7		122
229	Library analysis of SCHEMA-guided protein recombination. <i>Protein Science</i> , 2003 , 12, 1686-93	6.3	119
228	General method for sequence-independent site-directed chimeragenesis. <i>Journal of Molecular Biology</i> , 2003 , 330, 287-96	6.5	119
227	Temperature adaptation of enzymes: lessons from laboratory evolution. <i>Advances in Protein Chemistry</i> , 2000 , 55, 161-225		118
226	Molecularly imprinted ligand-exchange adsorbents for the chiral separation of underivatized amino acids. <i>Journal of Chromatography A</i> , 1997 , 775, 51-63	4.5	117
225	Structure-guided recombination creates an artificial family of cytochromes P450. <i>PLoS Biology</i> , 2006 , 4, e112	9.7	116
224	Multiple-site binding interactions in metal-affinity chromatography. I. Equilibrium binding of engineered histidine-containing cytochromes c. <i>Journal of Chromatography A</i> , 1994 , 662, 13-26	4.5	116
223	Design and evolution of enzymes for non-natural chemistry. <i>Current Opinion in Green and Sustainable Chemistry</i> , 2017 , 7, 23-30	7.9	115
222	A panel of cytochrome P450 BM3 variants to produce drug metabolites and diversify lead compounds. <i>Chemistry - A European Journal</i> , 2009 , 15, 11723-9	4.8	115
221	Template-mediated synthesis of metal-complexing polymers for molecular recognition. <i>Journal of the American Chemical Society</i> , 1991 , 113, 7417-7418	16.4	115
220	Chemo-enzymatic fluorination of unactivated organic compounds. <i>Nature Chemical Biology</i> , 2009 , 5, 26-8	11.7	114
219	Expanding P450 catalytic reaction space through evolution and engineering. <i>Current Opinion in Chemical Biology</i> , 2014 , 19, 126-34	9.7	112
218	Anti-Markovnikov alkene oxidation by metal-oxo-mediated enzyme catalysis. <i>Science</i> , 2017 , 358, 215-218	33.3	108
217	Specific Protein Attachment to Artificial Membranes via Coordination to Lipid-Bound Copper(II). <i>Langmuir</i> , 1994 , 10, 2382-2388	4	106
216	Learned protein embeddings for machine learning. <i>Bioinformatics</i> , 2018 , 34, 2642-2648	7.2	105
215	A glucose-sensing polymer. <i>Nature Biotechnology</i> , 1997 , 15, 354-7	44.5	105
214	Enantioselective epoxidation of terminal alkenes to (R)- and (S)-epoxides by engineered cytochromes P450 BM-3. <i>Chemistry - A European Journal</i> , 2006 , 12, 1216-20	4.8	102

213	Archaerhodopsin variants with enhanced voltage-sensitive fluorescence in mammalian and <i>Caenorhabditis elegans</i> neurons. <i>Nature Communications</i> , 2014 , 5, 4894	17.4	101
212	Engineering Cytochrome P450 BM3 for Terminal Alkane Hydroxylation. <i>Advanced Synthesis and Catalysis</i> , 2006 , 348, 763-772	5.6	101
211	Functional expression of horseradish peroxidase in <i>Saccharomyces cerevisiae</i> and <i>Pichia pastoris</i> . <i>Protein Engineering, Design and Selection</i> , 2000 , 13, 377-84	1.9	100
210	Chemomimetic biocatalysis: exploiting the synthetic potential of cofactor-dependent enzymes to create new catalysts. <i>Journal of the American Chemical Society</i> , 2015 , 137, 13992-4006	16.4	99
209	SCHEMA recombination of a fungal cellulase uncovers a single mutation that contributes markedly to stability. <i>Journal of Biological Chemistry</i> , 2009 , 284, 26229-33	5.4	99
208	Engineered thermostable fungal Cel6A and Cel7A cellobiohydrolases hydrolyze cellulose efficiently at elevated temperatures. <i>Biotechnology and Bioengineering</i> , 2013 , 110, 1874-83	4.9	96
207	Thermostabilization of a cytochrome p450 peroxygenase. <i>ChemBioChem</i> , 2003 , 4, 891-3	3.8	96
206	Molecular imprinting: selective materials for separations, sensors and catalysis. <i>Current Opinion in Biotechnology</i> , 1995 , 6, 218-224	11.4	96
205	Alkene epoxidation catalyzed by cytochrome P450 BM-3 139-3. <i>Tetrahedron</i> , 2004 , 60, 525-528	2.4	94
204	Enantioselective imidation of sulfides via enzyme-catalyzed intermolecular nitrogen-atom transfer. <i>Journal of the American Chemical Society</i> , 2014 , 136, 8766-71	16.4	92
203	Directed evolution: Creating biocatalysts for the future. <i>Chemical Engineering Science</i> , 1996 , 51, 5091-5102	14.4	92
202	Structure-guided SCHEMA recombination of distantly related beta-lactamases. <i>Protein Engineering, Design and Selection</i> , 2006 , 19, 563-70	1.9	91
201	Expression and stabilization of galactose oxidase in <i>Escherichia coli</i> by directed evolution. <i>Protein Engineering, Design and Selection</i> , 2001 , 14, 699-704	1.9	90
200	Combinatorial protein design: strategies for screening protein libraries. <i>Current Opinion in Structural Biology</i> , 1997 , 7, 480-5	8.1	89
199	Combinatorial alanine substitution enables rapid optimization of cytochrome P450BM3 for selective hydroxylation of large substrates. <i>ChemBioChem</i> , 2010 , 11, 2502-5	3.8	88
198	Analytical affinity chromatography. II. Rate theory and the measurement of biological binding kinetics. <i>Journal of Chromatography A</i> , 1986 , 355, 13-27	4.5	88
197	Analysis of shuffled gene libraries. <i>Journal of Molecular Biology</i> , 2002 , 316, 643-56	6.5	85
196	An enzymatic platform for the asymmetric amination of primary, secondary and tertiary C(sp) ³ -H bonds. <i>Nature Chemistry</i> , 2019 , 11, 987-993	17.6	84

195	Efficient screening of fungal cellobiohydrolase class I enzymes for thermostabilizing sequence blocks by SCHEMA structure-guided recombination. <i>Protein Engineering, Design and Selection</i> , 2010 , 23, 871-80	1.9	83
194	Analysis of affinity separations II: The characterization of affinity columns by pulse techniques. <i>The Chemical Engineering Journal</i> , 1985 , 30, B25-B36		83
193	Directed evolution of the tryptophan synthase β subunit for stand-alone function recapitulates allosteric activation. <i>Proceedings of the National Academy of Sciences of the United States of America</i> , 2015 , 112, 14599-604	11.5	82
192	Isobutanol production at elevated temperatures in thermophilic <i>Geobacillus thermoglucosidasius</i> . <i>Metabolic Engineering</i> , 2014 , 24, 1-8	9.7	82
191	Modification of galactose oxidase to introduce glucose 6-oxidase activity. <i>ChemBioChem</i> , 2002 , 3, 781-3	3.8	82
190	Multipoint binding in metal-affinity chromatography II. Effect of pH and imidazole on chromatographic retention of engineered histidine-containing cytochromes c. <i>Journal of Chromatography A</i> , 1996 , 725, 225-35	4.5	82
189	General approach to reversing ketol-acid reductoisomerase cofactor dependence from NADPH to NADH. <i>Proceedings of the National Academy of Sciences of the United States of America</i> , 2013 , 110, 10946-51	11.5	81
188	Diverse Engineered Heme Proteins Enable Stereodivergent Cyclopropanation of Unactivated Alkenes. <i>ACS Central Science</i> , 2018 , 4, 372-377	16.8	80
187	Chemoenzymatic elaboration of monosaccharides using engineered cytochrome P450BM3 demethylases. <i>Proceedings of the National Academy of Sciences of the United States of America</i> , 2009 , 106, 16550-5	11.5	80
186	On the conservative nature of intragenic recombination. <i>Proceedings of the National Academy of Sciences of the United States of America</i> , 2005 , 102, 5380-5	11.5	79
185	Enantioselective Total Synthesis of Nigelladine A via Late-Stage C-H Oxidation Enabled by an Engineered P450 Enzyme. <i>Journal of the American Chemical Society</i> , 2017 , 139, 10196-10199	16.4	78
184	Regioselectivity and Activity of Cytochrome P450 BM-3 and Mutant F87A in Reactions Driven by Hydrogen Peroxide. <i>Advanced Synthesis and Catalysis</i> , 2002 , 344, 932-937	5.6	76
183	Alternate Heme Ligation Steers Activity and Selectivity in Engineered Cytochrome P450-Catalyzed Carbene-Transfer Reactions. <i>Journal of the American Chemical Society</i> , 2018 , 140, 16402-16407	16.4	75
182	Discovery of a regioselectivity switch in nitrating P450s guided by molecular dynamics simulations and Markov models. <i>Nature Chemistry</i> , 2016 , 8, 419-25	17.6	74
181	Directed Enzyme Evolution 2003 ,		74
180	Laboratory evolution of toluene dioxygenase to accept 4-picoline as a substrate. <i>Applied and Environmental Microbiology</i> , 2001 , 67, 3882-7	4.8	73
179	Cu(II)-binding properties of a cytochrome c with a synthetic metal-binding site: His-X3-His in an alpha-helix. <i>Proteins: Structure, Function and Bioinformatics</i> , 1991 , 10, 156-61	4.2	73
178	Ausdehnung des Enzym-Universums: Zugang zu nicht-natürlichen Reaktionen durch mechanismusgeleitete, gerichtete Evolution. <i>Angewandte Chemie</i> , 2015 , 127, 3408-3426	3.6	72

177	Selective CH bond functionalization with engineered heme proteins: new tools to generate complexity. <i>Current Opinion in Chemical Biology</i> , 2019 , 49, 67-75	9.7	72
176	A General Tool for Engineering the NAD/NADP Cofactor Preference of Oxidoreductases. <i>ACS Synthetic Biology</i> , 2017 , 6, 326-333	5.7	71
175	Molecularly imprinted polymers on silica: selective supports for high-performance ligand-exchange chromatography. <i>Journal of Chromatography A</i> , 1995 , 708, 19-29	4.5	71
174	Engineering proteins for nonnatural environments. <i>FASEB Journal</i> , 1993 , 7, 744-9	0.9	71
173	Catalytic iron-carbene intermediate revealed in a cytochrome carbene transferase. <i>Proceedings of the National Academy of Sciences of the United States of America</i> , 2018 , 115, 7308-7313	11.5	69
172	Stereoselective Enzymatic Synthesis of Heteroatom-Substituted Cyclopropanes. <i>ACS Catalysis</i> , 2018 , 8, 2629-2634	13.1	68
171	In vivo evolution of butane oxidation by terminal alkane hydroxylases AlkB and CYP153A6. <i>Applied and Environmental Microbiology</i> , 2009 , 75, 337-44	4.8	68
170	Comparison of random mutagenesis and semi-rational designed libraries for improved cytochrome P450 BM3-catalyzed hydroxylation of small alkanes. <i>Protein Engineering, Design and Selection</i> , 2012 , 25, 171-8	1.9	68
169	The nature of chemical innovation: new enzymes by evolution. <i>Quarterly Reviews of Biophysics</i> , 2015 , 48, 404-10	7	67
168	Structure, dynamics, and thermodynamics of mismatched DNA oligonucleotide duplexes d(CCCAGGG) ₂ and d(CCCTGGG) ₂ . <i>Biochemistry</i> , 1987 , 26, 4068-75	3.2	67
167	A high-throughput digital imaging screen for the discovery and directed evolution of oxygenases. <i>Chemistry and Biology</i> , 1999 , 6, 699-706		66
166	Enantioselective Aminohydroxylation of Styrenyl Olefins Catalyzed by an Engineered Hemoprotein. <i>Angewandte Chemie - International Edition</i> , 2019 , 58, 3138-3142	16.4	66
165	Directed Evolution of a Cytochrome P450 Carbene Transferase for Selective Functionalization of Cyclic Compounds. <i>Journal of the American Chemical Society</i> , 2019 , 141, 8989-8995	16.4	65
164	Chemistry Takes a Bath: Reactions in Aqueous Media. <i>Journal of Organic Chemistry</i> , 2018 , 83, 7319-7322	4.2	65
163	Directed evolution of a far-red fluorescent rhodopsin. <i>Proceedings of the National Academy of Sciences of the United States of America</i> , 2014 , 111, 13034-9	11.5	65
162	Machine learning-guided channelrhodopsin engineering enables minimally invasive optogenetics. <i>Nature Methods</i> , 2019 , 16, 1176-1184	21.6	65
161	Directed Evolution Library Creation 2003 ,		63
160	Consensus protein design without phylogenetic bias. <i>Journal of Molecular Biology</i> , 2010 , 399, 541-6	6.5	62

159	Tryptophan phosphorescence study of enzyme flexibility and unfolding in laboratory-evolved thermostable esterases. <i>Biochemistry</i> , 2000 , 39, 4658-65	3.2	62
158	Metal-mediated protein stabilization. <i>Trends in Biotechnology</i> , 1994 , 12, 189-92	15.1	62
157	Review: Multipoint binding and heterogeneity in immobilized metal affinity chromatography. <i>Biotechnology and Bioengineering</i> , 1995 , 48, 437-43	4.9	62
156	Enzymatic Primary Amination of Benzylic and Allylic C(sp)-H Bonds. <i>Journal of the American Chemical Society</i> , 2020 , 142, 10279-10283	16.4	61
155	Enantiodivergent α -Amino C-H Fluoroalkylation Catalyzed by Engineered Cytochrome P450s. <i>Journal of the American Chemical Society</i> , 2019 , 141, 9798-9802	16.4	60
154	Colorimetric assays for biodegradation of polycyclic aromatic hydrocarbons by fungal laccases. <i>Journal of Biomolecular Screening</i> , 2002 , 7, 547-53		60
153	Analytical affinity chromatography. <i>Journal of Chromatography A</i> , 1986 , 355, 1-12	4.5	60
152	Gerichtete Evolution: Wie man neue Chemie zum Leben erweckt. <i>Angewandte Chemie</i> , 2018 , 130, 4212-4218	4.5	60
151	Machine learning to design integral membrane channelrhodopsins for efficient eukaryotic expression and plasma membrane localization. <i>PLoS Computational Biology</i> , 2017 , 13, e1005786	5	59
150	Unlocking Reactivity of TrpB: A General Biocatalytic Platform for Synthesis of Tryptophan Analogues. <i>Journal of the American Chemical Society</i> , 2017 , 139, 10769-10776	16.4	59
149	A mathematical model for metal affinity protein partitioning. <i>Biotechnology and Bioengineering</i> , 1990 , 35, 682-90	4.9	59
148	Directed evolution of <i>Gloeobacter violaceus</i> rhodopsin spectral properties. <i>Journal of Molecular Biology</i> , 2015 , 427, 205-20	6.5	58
147	Diversification of catalytic function in a synthetic family of chimeric cytochrome p450s. <i>Chemistry and Biology</i> , 2007 , 14, 269-78		58
146	Functional expression of horseradish peroxidase in <i>E. coli</i> by directed evolution. <i>Biotechnology Progress</i> , 1999 , 15, 467-71	2.8	58
145	Characterization of His-X3-His sites in alpha-helices of synthetic metal-binding bovine somatotropin. <i>Protein Engineering, Design and Selection</i> , 1991 , 4, 301-5	1.9	58
144	Engineering Protein-Lipid Interactions: Targeting of Histidine-Tagged Proteins to Metal-Chelating Lipid Monolayers. <i>Langmuir</i> , 1995 , 11, 4048-4055	4	57
143	Engineering enzymes for noncanonical amino acid synthesis. <i>Chemical Society Reviews</i> , 2018 , 47, 8980-8997	9.75	57
142	Improved Cyclopropanation Activity of Histidine-Ligated Cytochrome P450 Enables the Enantioselective Formal Synthesis of Levomilnacipran. <i>Angewandte Chemie</i> , 2014 , 126, 6928-6931	3.6	56

141	A colorimetric assay to quantify dehydrogenase activity in crude cell lysates. <i>Journal of Biomolecular Screening</i> , 2002 , 7, 135-40		56
140	Catalysts on Demand: Selective Oxidations by Laboratory-Evolved Cytochrome P450 BM3. <i>Chimia</i> , 2009 , 63, 309-312	1.3	54
139	A Metal-Chelating Lipid for 2D Protein Crystallization via Coordination of Surface Histidines. <i>Journal of the American Chemical Society</i> , 1997 , 119, 2479-2487	16.4	54
138	Highly Stereoselective Biocatalytic Synthesis of Key Cyclopropane Intermediate to Ticagrelor. <i>ACS Catalysis</i> , 2016 , 6, 7810-7813	13.1	53
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