0–9	Algorithmic music, 192
1 % magic, xii, 119, 125	Ames, Charles, 195
1/f law, 259	Arendt, Hannah, 106
10,000 hour rule, 117	Arnheim, Rudolf, 279
	Arousal potential, 279, 280
A	Art
A-Life, see artificial life	and aesthetics, 296
AARON, ix, 7–10, 24, 64, 83–86, 106, 127,	computer, see computer art
220, 340, 374, 377, 378	evolutionary, see evolutionary art
Actor network, 366	Artificial intelligence, ix, 4, 11, 152, 159, 181,
Adobe Photoshop, v, 22, 190, 213	225, 257, 340, 347, 361, 390
Aesthetic evolution, see interactive genetic	and art, 7
algorithm (IGA)	Artificial life, 173, 272, 340
Aesthetic judgement, 32, 57, 296, 317	Automation, 16, 20, 55–57, 150, 423
in photography, 260	Autonomy, xii, 5, 12, 35, 98, 148–150, 152,
to understand aesthetics, 318	153, 156, 158, 162–164, 166, 175,
vs evaluation, 100	176, 178, 179, 193, 198, 339, 395,
Aesthetic measure, 325	396, 398, 400, 402
Birkhoff's, 88, 101, 102, 258, 261, 267,	
275	В
Aesthetic process, 80	Babbage, Charles, 236
Aesthetic rejection, 50	Barbaud, Pierre, 79
Aesthetic reward, 324	Basalla, George, 40
Aesthetic universals, 44, 260	Bateson, Gregory, 387
Aesthetics, 100, 325	
and art, 296	Beauty, 14, 108, 256, 258, 260, 286, 324, 329, 332
generative, see generative aesthetics	
gestalt, 260	Bebop, 193
information, see information aesthetics	definition, 119
of human faces, 260	Bense, Max, 66, 67, 79, 100, 106, 108
phenomenological, 104	Berlyne, Daniel, 274, 279, 280
Agency, 52, 148, 164–167, 169, 172, 179, 180,	Biomorph, 298, 354–356
183, 195, 196, 199, 366, 367, 377,	Bird song, 270
378	and virtuosity, 117
Agent-based model, 53, 150, 272, 372	Birkhoff, George D., see also aesthetic
Al, see artificial intelligence	measure, 108, 258
Algorithmic art, 65, 99	Blackwell, Tim, xi

Boden, Margaret A., viii, ix, 39, 109, 206, 342, 350, 386	Constraint, 26–29, 42, 43, 87, 117, 122, 134, 143, 151, 166, 181, 210, 218, 219,
Bolin, Liu, 116	223, 229, 246, 266, 309, 348, 350,
Bowerbird, 353	351, 353, 358
Bown, Oliver, xi, xii, 51	Constraint satisfaction problem, 139
Brainstorming, 374	Continuator (music system), 128, 162, 167,
Bricolage, xi, 238–240, 246–248	179, 192, 194
Brooks, Rodney, 408	Cope, David, 182, 220
Brown, Andrew, xi	Cornock, Stroud, 182
	Creative Creative
Brownian process, <i>see also</i> random walk, 131, 265	coding, viii
Brushes (software), v	ecosystem, <i>see also</i> ecosystemics, 45, 340, 375, 376, 378
C	order, 345
Cage, John, 181, 182, 198	space, 41–43, 45, 208, 211–215, 355
Cariani, Peter, xii	Creativity
Chance, see randomness	and education, 424
	and IQ tests, 62
Chen, Eileen, 34	and novelty, 169
Clark, Andy, 177 Coevolution, 168, 269–271, 274, 286	and value, 110, 350, 423
Cognition, 104, 152, 159, 163, 170, 178, 209,	attribution between human and computer,
224, 235, 240, 275, 279, 282, 284,	72, 235, 423
366, 367, 378	computational, see computational creativity
	concept of, 61, 341
Cohen, Harold, vi, ix, 7, 83–86, 111, 220, 374 Colour theory, 260, 306	definition of, xii, 40, 323, 341–344
•	history of, 349
Coltrana, John 122	individual vs group, 62
Complexity massure as also information	measure, 354
Complexity measure, see also information	social aspects, 165, 224, 364
complexity, 267, 276, 298	stimulus for, 57
Compression, 350	subjective, 384
algorithm, 331	transformational, 248, 386
and learning, 326	Critics, 64, 96, 101, 300
Computation, 178	artificial, 259, 270, 271, 297
and mind, see mind	Crowd-sourcing, 8, see also evaluation
Computational creativity, 3, 305, 324, 361,	Csikszentmihalyi, Mihaly, 249
365, 372, 391	Csuri, Charles, 63, 77–79
Computationalism, 159, 407 Computer	Culture, vii, 44, 45, 104, 196, 220, 222, 241, 245, 248, 348, 366, 368, 369
as artist, 5	as a creative system, 367
as collaborator, 5, 179, 195	generative aspects, 229
as tool, 73, 178	hacker, see hacker culture
Computer art, v, vi, 15, 29, 63, 65, 72, 74, 78,	machine, 172
89, 92, 104, 235, 342	Western, 98, 116
and value, 111, 197, 423	Curiosity, 273, 274, 323–325
Computer Arts Society, 237	Curious agents, 273, 274, 325, 330
Computer programming	Cybernetics, 48, 52, 104, 105, 386, 389, 400,
as a creative activity, v, 81, 424	402
esoteric languages, 236	taxonomy of devices, 395–397
evolutionary, see evolutionary computing,	_
interactive, 249, 250	D
Conceptual space, see also creative space, 41,	Dagstuhl seminar, ix, xv, 31, 90, 96, 109, 206
151, 168, 185, 215, 216, 243, 246	Dahlstedt, Palle, xi, 23, 51
Connectionism, 159, 407	Daisyworld, 53

Danto, Arthur C., 326	of technology, 40
Davis, Miles, 123	open-ended, 354
De Bono, Edward, 181	sexual selection, see sexual selection
De Landa, Manuel, 45	Evolutionary
Deep Blue (chess playing software), xi	algorithm, 155, 206, 226, 262, 263, see
Demoscene, 236	also coevolution, 309, 384
Dennett, Daniel, 216	interactive, see interactive genetic
Design ecologies, 47	algorithm (IGA)
Design Judgement Test, 300, 301, 313	art, 7, 9, 28, 261, 263, 264, 269, 271, 286,
Design pattern, 51, 247	307, 309, 315
Di Battista, Stefano, 120	cheesecake, 369, 372
Di Meola, Al, 120	computing, 40, 43, 263, 264, 269
Di Scipio, Agostino, 48, 51	creativity, 40, 222, 226, 354
d'Inverno, Mark, xi, 143	music composition, 222, 266–268
Domain knowledge, 159	Evolvable hardware, 286
Dorin, Alan, xii, 51	Expert system, 83, 143
Drawbots, 44, 377	Extended mind hypothesis, 177, 180, 240, 247,
Driessens and Verstappen, 49, 265	366, 367
Dual coding theorem, 244	300, 307
Dualism, 106	F
Duchamp, Marcel, 75	Fads, 371
	Faure-Walker, James, 10, 20
Duchamp's urinal, 345, 395	Feedback, 52, 177, 183–185, 193, 200, 238,
Dutton, Denis, 264, 277	239, 353, 372, 422
Dynamical system, 48, 51, 150, 159–161, 191,	
340, 372	Feynman, Richard, 177
T.	Fibonacci series, 258
E	Fitness function, 9, 24–27, 44, 188, 194,
Ecology, 46, 47, 62	263–265, 273, 274, 285, 309, 370
Ecosystem, 344, 352, 375	using error measures, 266, 267
creative, see creative ecosystem	Fitt's law, 117
principles of, 46	Flickr, 8, 29, 34
Ecosystemics, 39, 56–58, 274, 376	Flow, 167, 217, 249, 422
Edmonds, Ernest, 182	Fluxus, 180
Elephant art, 353	Form follows function, 264
Elop, Stephen, 45	Fractal, 5, 50, 155, 160, 259, 260, 333
Embodiment, 93, 119, 170, 177, 188, 248, 257	compression, 267, 275, 307, 308, 311, 312
Emergence, 149, 171, 221, 269, 273, 341, 383,	dimension, 311
386–395	flame art, 263
Emergent behaviour, 161	image, 328
Emotion	Frank, Helmar, 102
computer modelling, 21–24	Free will, 105, 110
its role in art, 20	
Eno, Brian, 181	G
Esoteric programming language, see computer	Gaia theory, 363
programming	Galanter, Philip, xi
Essl, Karlheinz, 182	Gell-Mann, Murray, 275
Evaluation, 96–110, 171, 255–257	Generative, 222
and subjectivity, 108	aesthetics, 72, 86
crowd-sourced, 263	algorithm, see also algorithmic art, 194
in animals, 353	art, 7, 51, 64, 80, 81, 163, 179, 226, 263,
Evolution, 344, 352, 362–365, 372, 373, 389	340, 354
as a creative system, <i>see</i> evolutionary	software, 10, 28, 104
creativity	design, 47, 90
of art, 264, 277, 278	grammar, 66, 268
01 010, 201, 211, 210	o

Generative (cont.)	Johnson-Laird, Philip, 119
music, 170, 182, 186, 189, 191, 196, 200, 216, 259	Jones, Daniel, xi
system, 42, 343, 358, 362, 368	K
Generativity, 179	K-means clustering, 31
Genetic programming, 298, 304, 309, 315	Kant, Immanuel, 106, 326
GenJam (music system), 126, 198	Kasparov, Garry, xi
Gerstner, Karl, 67	Kin selection, 369
Gillespie, Dizzy, xii, 119	Klee, Paul, 81, 92, 238, 250
Gödel's theorem, 391	Klondike space, 40, 41, 44, 58
Golden mean, 100, 108	Knowledge domain, see domain knowledge
Golden ratio, 258	Knowledge representation, 159
Google, vii, 8, 34	Knuth, Donald, 81
images, 29	Koenig, Gottfried, 182
Gould, Stephen Jay, 277	Kolmogorov complexity, 328
Group selection, 369	Komar and Melamid, 264 Korb, Kevin B., xii
Н	KOIO, KEVIII D., XII
Hacker culture, 236	L
Hadjikyriakos-Ghikas, Nikos, 100	L-system, 155, 190
Haeckel, Ernst, 46	La Mettrie, Julien (Offray de), 91
Handicap principle, 363	Lagrene, Bireli, 120
Harrison, John, 370, 377	Lemaire, Alexis, 116
Hedonic response, 279, 280, 283	Lewis, George, 374
Heuristics, 88, 181, 184, 307, 345, 369, 387,	LeWitt, Sol, 75
413	Live algorithms, xi, 147, 148, 172, 193
creative, 217	Live coding, 156, 194, 250
musical, 137	Lloyd Morgan, Conway, 386
Hick's law, 117	Lloyd Wright, Frank, 31
Hiller, Lejaren, 181	Local optimum, 265
Hockney, David, v	Lunenfeld, Peter, 64
Holdsworth, Allan, 123	
Homeostasis, 53	M
Honest signalling theory, 363, 369	Markov model, 122, 127–130, 138, 139, 143, 159, 167, 192
I	Martindale, Colin, 279, 281–283
Imagination, 8, 13, 28, 153, 180, 208, 223,	Mash up, 423
240, 249, 367	Matisse, Henri, 346
Improvisation, 149, 181, 218	Max/MSP, 156, 170, 189, 244
group, 158, 224 jazz, 119	McCormack, Jon, x, 9, 187 McCulloch, Warren, 402
Information, 178	McLaughlin, John, 120, 125, 141
aesthetics, 86–88	McLean, Alex, xi
complexity, 277	Mechanical Turk, 264
theory, 87, 127, 159, 280, 325, 333	Meme, 165, 166, 367
Inspiration, 80, 104, 180, 256, 296, 342	Memory model, 143, 229, 285, 409
Interactive genetic algorithm (IGA), 42, 44,	Mersenne, Marin, 348
263, 264, 355, 367	Metaphor, 40, 229
Interactive programming, see computer	in programming, 240–242
programming	Microsoft word paperclip, 422
Interactivity, 6, 166, 189-191, 422	MIDI, 161, 167–169
	Mind
J	and computation, 109, 226
Jarrett, Keith, 97	and machine, 367

Mind (cont.) theory of, 163 Minimum description length, 328 Minimum message length, 328 Mirroring, 162, 165, 167, 192 Mohr, Manfred, 63, 79–81, 197 Molnar, Vera, 63, 76, 77 Monet, Claude-Oscar, 313 Monk, Thelonius, 185 Moore's law, 392 Mozart, Wolfgang A., 348 Mutator (software), 9	Pollock, Jackson, 259 Pólya, George, 181 Prediction, 216, 217 Predictive model, 326 Probabilistic grammars in jazz improvisation, 127 Problem solving, xi, 11, 103, 119, 159, 225 Programming, see computer programming Putnam, Hilary, 342 Q Quadtree, 88, 103 Ouelia, 257
N Nachmanovitch, Stephen, 216 Nake, Frieder, x, 64, 66, 86–90, 111 Nees, Georg, 66, 92 Neural network, 155, 170, 261, 262, 274, 282, 285, 298, 312, 314, 386, 405–407, 411 Neuroaesthetics, 284 NEvAr, 9, 267 New media, 6 Niche construction, 53–55, 271, 272, 286, 353, 372 Nietzsche, Friedrich, 73, 177, 195 Nodal (music software), 187, 189, 198, 250 Noll, A. Michael, 66 Novelty, 148, 150, 152, 153, 324 and creativity, 164, 220 and unpredictability, 325 search, 316	Qualia, 257 R Racter (software), 347 Random drawing process, 70 noise, 325, 328 typing, 353 walk, see also Brownian process, 128, 265 Randomness, 70, 158, 180, 342, 348 Reactive programming, 249 Reich, Steve, 190 Reinforcement learning, 324, 327, 330 Representation, 211, 227, 240, 266, 343, 345 Reward function, 53, 324 Rugoff, Ralph, 20 Rule-based system, 83, 130, 159, 161, 179 S Sampling, 178 Schmidhuber, Jürgen, xii Schmidt, Eric, vii
O Observation, 52–55, 389 Odum, Eugene and Howard, 46 One-step-max theorem, 122, 132 Open-endedness, see also evolution:	Search, 40–42, 185, 221, 246, 329, 345, 362 Self-organisation, 50, 149, 385, 391 Self-organising map, 262, 298 Semiotics, 73, 79, 82 Sensor evolution, 393, 394 Sexual selection, 270, 372 Shaffer, James, 78 Shakespeare, William, 342 Side-slipping, 123, 124, 193 Sims, Karl, 265 Sketches, 224, 225 Slow technology, 57 Snow, C. P., 84 Software, see computer programming Sommerhoff, Geoff, 105 Sonderborg, K.H.R., 79 Spandrel, 277 Spirograph, 362 Sternberg, Robert J., viii Stochastic process, see randomness, 343 Stockhausen, Karlheinz, 187

Style classification, 305, 306 Subjectivity, 326, <i>see also</i> creativity subjective Sullivan, Louis H., 264 Surrealism, 180 Swarm system, 155, 169, 272–274, 286	Visual Aesthetic Sensitivity Test, 300 Von Hentig, Hartmut, 61 Von Kempelen, Wolfgang, 264 Voyager (music software), 169, 182, 374
T Tansley, Arthur, 46 Tatou, Audrey, 21 Tatum, Art, 123, 125 Tools, 103, 175, 176, 208–210, 222–224, 365 Tristano, Lennie, 123 Turing test, 13–15, 284 Two cultures (C.P. Snow), 84	W Weizenbaum, Joseph, 86 Whitelaw, Mitchell, 51 Wiggins, Geraint, xi Word salad, 348 Writing, 181 Wundt, Wilhelm, see also Wundt curve, 280 Wundt curve, 188, 274, 280, 325, 395
V Valstar, Michel, 23 Van Gogh, Vincent, 313 Varini, Felice, 115 Verstehen, 348 Video	X Xenakis, Iannis, 182, 190, 197, 198 Y Young, La Monte, 181 Young, Michael, xi
art, 197 games, 6, 9 installations, 7 Virtuosity, x, 98, 115 and cognitive science, 117	Z Zero-sum game, 330 Zipf, George K., 259 Zipf's law, 259, 261, 303, 311, 312