

Index

- Abate, T. 176
absorption capacity 34
academic freedom 9, 12–13, 81, 83, 93,
101, 103, 108, 111, 169–71, 180,
182–3, 188
see also faculty autonomy
active strategy 83, 160, 172, 175, 182,
187
see also bargaining space; passive
strategy; templates for PPRPs
adjunct faculty 14, 92–4, 97–8
Aghion, P. 131, 139–40, 155–6, 185
Agricultural Research Service (ARS)
at the US Department of
Agriculture 102, 263–78
see also Cooperative Research and
Development Agreement;
guidelines; US Department of
Agriculture
agricultural science
assets 162
funding trends 27–9
knowledge 70
see also biotechnology; land-grant
universities
Alonso-Conde, A. 134, 147
Alston, J.M. 27
Ameden, H. 158
Anderson, M.S. 10
applied research 18, 22–5, 31–3, 37–40,
51–2, 54–60, 67, 81, 94, 99, 150,
166, 169
see also basic research; mousetraps;
private goods; research models
appropriability 73, 76–7
Araujo, S. 138, 164
Arora, A. 34, 74
Arrow, K.J. 71, 73
ARS (Agricultural Research Service)
at the US Department of
Agriculture) 102, 263–78
see also Cooperative Research and
Development Agreement;
guidelines; US Department of
Agriculture
Arthur, B.W. 70
Association of University Technology
Managers (AUTM) 6–7, 189
AT&T Bell laboratories 24
Athias, L. 138, 164
Audretsch, D. 35
authority
assigned 12, 106–12, 118–19, 121–4,
131–7, 143–6, 149–53
joint 107, 129
see also background rights; control
premium; control rights;
decision making authority;
governance structure;
intellectual property; structure
of research partnerships
AUTM (Association of University
Technology Managers) 6–7, 189
automotive companies 88
see also Power Electronic Building
Block
Azoulay, P. 32
background rights 82, 159, 186
see also authority; control premium;
control rights; decision making
authority; governance structure;
intellectual property; structure
of research partnerships
bargaining 72, 41–8, 50–56, 105–13,
129–30, 140, 157–60, 167–8
axiomatic specification for
cooperative versus non-
cooperative outcomes 115–17
impure goods 144, 146
interest subgroups 112
power coefficients 110

- space 13, 39, 41, 158, 160, 172, 174-7, 180-87
see also collective choice and decision making; Nash-Harsanyi framework; Nash cooperative bargaining solution; negotiation; templates for PPRPs; structure of research partnerships
- Barroso, Jose Manuel 11
- basic research 18, 22-5, 37, 39, 54, 57-8, 60-61, 67, 81, 90, 94, 9, 139, 156-7, 169-70, 183, 185
 funding trends 4, 30-34, 37
see also applied research; public goods; research models; theorems
- Bayh-Dole Act 5-7, 28, 32, 37, 68
- Beattie, B. 28
- Beaudry, C. 35
- Beggs, A.W. 166
- Bekelman, J.E. 185
- Bell Laboratories 24-5
 benefit separability 46
see also research models
- benefits of partnerships 5, 8, 10, 13, 17, 30, 32, 46-9, 81-104, 113, 131-6, 139, 146-50, 155-8, 161, 164, 167, 184-8
see also risks of partnerships
- Bennet, A. 79
- Bennett, J. 135-6
- Berdahl, Robert 98-9
- Bergman, K. 79
- Berkeley-Novartis 87-8, 92-99, 103-104, 174-82
see also College of Natural Resources; Department of Plant and Microbial Biology; Novartis Agricultural Discovery Institute; University of California, Berkeley
- Bero, L.A. 10
- Besley, T.J. 132-3, 139, 144-5
- BHEF (Business-Higher Education Forum) 82, 87-91, 93, 99
see also guidelines; *Working Together, Creating Knowledge: The University-Industry Research Collaboration Initiative*
- Biolex, Inc. 88
see also spinoffs
- bioprospecting 75-6
- biotechnology 34-6, 89-92
 early-stage firms 33
 intellectual property rights 6-7, 71, 77-80, 140
 knowledge 34, 70-72, 74, 76-80
 research 17, 24, 157, 162, 176
see also agricultural science; land-grant universities
- Biscotti, D. 35
- Blanc-Brude, F. 137
- Bloom, N. 131, 185
- Blume-Kohout, M. 33
- Blumenstyk, G. 95, 185
- Blumenthal, D. 10, 32
- Blundell, R. 131, 185
- Bolton, P. 131, 139-40, 155-6
- Boots Co. 9-11
- BP (British Petroleum) 90, 148-50
- Breschi, S. 31-2
- Brewer, M.B. 6, 33-4
 bridging scientists 33
- British Petroleum (BP) 90, 148-50
- Brooks, H. 186
- Brown, C. 134, 147
- Buchanan, Bob 95-6
- Bush, Vannevar 21-4, 37
see also paradigms of scientific research
- Business-Higher Education Forum (BHEF) 82, 87-91, 93, 99
see also guidelines; *Working Together, Creating Knowledge: The University-Industry Research Collaboration Initiative*
- C2B2 (Center for Biorefining and Biofuels) 150-51
see also Center Executive Board; renewable energy
- Cabral, S. 137, 146
- Callaert, J. 31-2
- Caltech Boeing Strategic Agreement 91
see also University-Industry Demonstration Project
- Campbell, E. 10, 32

- Carnegie Mellon University 7, 90
see also lablets; open collaborative research
- case studies 87, 136–9
 Berkeley–Novartis 87–8, 92–99, 103–104, 174–82
 Biorex, Inc. and North Carolina State University 88
 Boots Co. 9–11
 Business–Higher Education Forum 87–90
 Caltech Boeving Strategic Agreement 91
 Center for Biorefining and Biofuels 150–51
 Energy Biosciences Institute 90, 148–50
 General Electric’s University Strategic Alliance Program 89–90
 Global Climate and Energy Project 150–51
 IBM’s Open Collaborative Research Program 90
 infrastructure 147–8
 Intel lablets 90
 Iowa State University and ConocoPhillips 151–2
 Massachusetts Institute of Technology Media Lab 90–91
 Power Electronic Building Block 88–9
 President’s Council of Advisors on Science and Technology 89–91
 renewable energy 148–52
 Ribozyme Pharmaceuticals, Inc. and University of Colorado 89
 University–Industry Demonstration Partnership 91–2
University–Private Sector Research Partnerships in the Innovation Ecosystem 89–91
 University of Tennessee, Scintillation Materials Research Center and Siemens Medical Solutions 91–2
 Washington University Medical School and Monsanto 176
 WU–Monsanto 87, 174–82
see also empirical research
- Causino, N. 10, 32
- CEB (Center Executive Board) 150–51
see also Center for Biorefining and Biofuels; research agenda
- CEF (cooperative efficiency frontier) 119–28
- Center Executive Board (CEB) 150–51
see also Center for Biorefining and Biofuels; research agenda
- Center for Biorefining and Biofuels (C2B2) 150
see also Center Executive Board; renewable energy
- Center for Studies in Higher Education (CSHE) 92, 96
see also evaluations; reviews
- Center on Budget and Policy Priorities 1
- CFS (complete feasibility set) 121–6
- Chan-Kang, C 27
- Chapela, D.I. 95
- Chong, E. 136, 138, 146, 161, 164
- Christ, C.F. 19
- Chung, A. 7
- Clard, O. 10
- clinical research and trials 87
see also types of PPRPs
- CNR (College of Natural Resources) 13, 92, 96, 176–7
see also Berkeley–Novartis; Department of Plant and Microbial Biology; University of California, Berkeley
- Cockburn, A. 177
- Cohen, W.M. 69
- collective choice and decision making 12, 105, 112–13, 183
see also bargaining; governance structure; Nash–Harsanyi framework; Nash cooperative bargaining solution; negotiation
- College of Natural Resources (CNR) 13, 92, 96, 176–7
see also Berkeley–Novartis; Department of Plant and Microbial Biology; University of California, Berkeley

- complements 29–34
see also crowding-in and crowding-out
- complete feasibility set (CFS) 121–6
- confidentiality agreements 14, 73, 82, 85, 94, 100, 149, 188
- conflict and controversies in PPRPs 8, 9, 12, 14–15, 22, 85, 100–103, 105, 115, 139, 156, 170, 176, 183–4
 Berkeley–Novartis 92–9, 174
 ideology 107
 land-grant university research 28
 resolution 84, 106–107, 163
 strategies 115, 117, 124
see also conflicting research objectives; research agenda
- conflict of interest 81, 99, 103, 170
- conflicting research objectives 11–15, 81
see also conflict and controversies in PPRPs; research agenda
- ConocoPhillips 151–2
see also impure goods; renewable energy
- consortia 86, 135, 168, 172
see also types of PPRPs
- control premium 15, 78, 107, 110, 129–42
see also authority; background rights; control rights; decision making authority; governance structure; intellectual property; structure of research partnerships
- control rights 11–12, 15, 101–102, 106, 110, 129, 131–61, 168–77, 181–88
 back-end 158, 159, 161, 164–7, 170–7, 173–5, 177, 182, 187, 188
 front-end 157–9, 161–2, 167, 170–71, 175, 182, 187
see also authority; background rights; control premium; decision making authority; governance structure; intellectual property; structure of research partnerships
- cooperative efficiency frontier (CEF) 119–28
- Cooperative Research and Development Agreement (CRADA) 102–103, 263–84
see also guidelines; US Department of Agriculture; US Department of Energy
- cooperative solution 105–107, 112, 116, 119, 120, 122, 129, 146
see also Nash–Harsanyi framework; Nash cooperative bargaining solution
- core principles 10, 83–4, 98, 103, 108, 169
see also cultural differences; ideology
- Cornell University 99–102, 205
see also guidelines
- cost of power to the partner 118, 119, 130
see also objective function
- cost separability 46
see also research models
- CRADA (Cooperative Research and Development Agreement) 102–103, 263–84
see also guidelines; US Department of Agriculture; US Department of Energy
- cross-licensing agreements 72
see also intellectual property; licensing
- crowding-in and crowding-out 29–33, 39–64, 93
see also complements; substitutes
- Crozie, R. 25
- CSHE (Center for Studies in Higher Education) 92, 96
see also evaluations; reviews
- CU (University of Colorado) 89, 151
- cultural differences 10, 14, 81–4, 88, 103, 108–109, 169, 184, 186
see also core principles; ideology
- Cyert, R.M. 19
- Dalton, R. 176
- Darby, M.R. 6, 33–4
- DARPA (Defense Advanced Research Projects Agency) 17, 22
see also National Science Foundation
- David, P. 7, 17, 29–31

- Debackere, K. 31–2
 Debre, P. 24
 Dechenaux, E. 166
 decision-making authority 12, 106–107, 111, 146, 149, 151–3, 161, 167
see also authority; background rights; control premium; control rights; governance structure; intellectual property; structure of research partnerships
 Defense Advanced Research Projects Agency (DARPA) 17, 22
see also National Science Foundation
 Department of Agriculture 3, 102
 guidelines 263–78
see also Agricultural Research Service; Cooperative Research and Development Agreement
 Department of Energy (DOE) 102–103, 252, 279–84
see also Cooperative Research and Development Agreement; guidelines
 Department of Plant and Microbial Biology (PMB) 87–8, 92–8, 174–6, 181
see also Berkeley–Novartis; College of Natural Resources; University of California, Berkeley
 Deresiewicz, W. 9
 Desai, S. 35
 Desrieux, C. 138, 161, 164
 Dewatripont, M. 131
 Diamond, A.M. 30–31
 Diamond v. Chakrabarty 6, 69
 Ding, W. 32–3
 disagreement outcomes 41–2, 53–4, 106, 115, 123, 127
see also bargaining; negotiation; non-cooperative solution; renegotiation; threat points
 Djulbegovic, B. 10
 DOE (Department of Energy) 102–103, 252, 279–84
see also Cooperative Research and Development Agency; guidelines
 Drago, R.W. 131, 134–5
 early-stage firms 35
see also early stage research
 early-stage research 34–5, 140–41, 157, 174
 EBI (Energy Biosciences Institute) 90, 148–50
see also renewable energy
 economic efficiency frontier (EEF) 119–28
 economic feasibility set (EFS) 119–28
 EEF (economic efficiency frontier) 119–28
 EFS (economic feasibility set) 119–28
 Eisenberg, R.S. 72, 83, 185
 empirical research 19–20, 27–38, 76, 108, 113–14, 136–9, 141 155–8, 161–2, 183–4
see also case studies
 Energy Biosciences Institute (EBI) 90, 148–50
see also renewable energy
 Engel, E. 146–7
 equal feedback 55
see also equal weighting; research models
 equal weighting 55
see also equal feedback; research models
 Ervin, D. 35
 Estache, A. 147
 European Commission 11
 European Economic Plan 11
 evaluations 92–3, 96–7, 103–104, 137–9, 151, 158, 167–8, 171, 181
see also Berkeley–Novartis; Center for Studies in Higher Education; Michigan State University; Price and Goldman; reviews
 Evenson, R. 28
 Fabrizio, K. R. 32
 faculty
 attitudes and opinions 8–9, 14, 22, 92–6, 98–9
 autonomy 13–14, 101, 103, 108
see also academic freedom
 competition for 68
 control rights 176–8
 incentives 8, 28–9, 68, 96

- licensing 32-4, 180
- research agenda 14, 84, 87-8, 92-3, 96-7, 151-2, 163, 166
- spinoffs 170
- see also* adjunct faculty
- Fernald, J. 1
- Fischer, R. 146-7
- Fosfuri, A. 74
- Francesconi, M. 144-6
- free riding 108, 112
- see also* collective choice and decision making
- Frick, P. 73
- Fuglie, K.O. 27
- Galetovic, A. 146-7
- Gallini, N.T. 166
- Gambardella, A. 34, 74
- Gardner, B.L. 27
- Gausch, J.L. 134, 147
- GCEP (Global Climate and Energy Project) 150-51
- see also* impure goods; renewable energy; Stanford University
- Geertz, C. 109
- General Electric's University Strategic Alliance Program (GEUSAP) 89-90
- genetically modified organisms (GMOs) 6, 69, 78, 92, 176
- see also* biotechnology; Diamond v. Chakrabarty; Monsanto
- GEUSAP (General Electric's University Strategic Alliance Program) 89-90
- Ghatak, M. 132-3, 139, 144-5
- Gill, M. 27
- Gingras, Y. 32
- Gittelman, M. 35
- Glenna, L. 35
- Global Climate and Energy Project (GCEP) 150-51
- see also* impure goods; renewable energy; Stanford University
- global ideal point 42, 54
- see also* research models
- GMOs (genetically modified organisms) 6, 69, 78, 92, 176
- see also* biotechnology; Diamond v. Chakrabarty; Monsanto
- Godin, B. 32
- Goldman, L. 93-4, 98
- Goldsmith, H. 137
- governance structure 39, 84, 88, 103, 149, 151-3, 159, 163, 170-71, 174-5, 177
- Berkeley-Novartis 92-6
- collective decision making 105-30
- criterion function 106-107, 112, 118-28
- complete feasibility set (CFS) 121-6
- cooperative efficiency frontier (CEF) 119-28
- economic efficiency frontier (EEF) 119-28
- economic feasibility set (EFS) 119-28
- penalty function 118-20, 124-6
- reward function 118, 120, 122, 125-6
- evaluation of 137-9
- joint authority 129-30
- see also* authority; background rights; collective choice and decision making; decision making authority; control premium; control rights; structure of research partnerships
- Government-University-Industry Research Roundtable (GUIRR) 91-2
- see also* guidelines
- graduate students 9, 81, 85-7
- academic freedom 101, 103
- Berkeley-Novartis 93-6
- funding 111, 187
- University-Industry Demonstration Partnership 91-2
- Graff, G.D. 76, 79, 87, 185
- von Grebmer, K. 146
- Green, J.R. 77
- Greenberg, D. 28
- Griffith, R. 131, 185
- Gross, C.P. 185
- Grossman, S.J. 131-3, 144-5
- Guerzoni, M. 35
- guidelines 91, 99-103, 139, 187-8, 205-84

- Business–Higher Education Forum
Cooperative Research and
Development Agreement
102–103, 279–84
Cornell University 99–102, 205–16
Government–University–Industry
Research Roundtable 91–2
Massachusetts Institute of
Technology 217–35
National Institutes of Health 85,
164–5, 178
Stanford University 236–50
University–Industry Demonstration
Partnership 91–2
University of California 251–62
US Department of Agriculture,
Agricultural Research Service
263–78
US Department of Energy 102–103,
279–84
*Working Together, Creating
Knowledge: The University–
Industry Research Collaboration
Initiative* 87, 91, 93
GUIRR (Government–University–
Industry Research Roundtable)
91–2
see also guidelines
Gulbrandsen, M. 32
Gupta-Mukherjee, S. 32–3
- Hall, B.H. 29–31
Hamilton, K. 31
Hamm, S. 11
Harsanyi, J.C. 106, 111
see also Nash–Harsanyi framework
Hart, O.D. 131–6, 144–5, 156
Hartwich, F. 146
Harvard University
informal relationships 173–4
research and growth 7
Hausman, D.M. 109
Heiman, A. 76, 185
Heller, M.A. 72, 83, 185
Hertzfeld, H.R. 82
hold-up rights 10–11, 71–2, 77, 82, 183,
186
see also background rights;
intellectual property;
publication delay
- Howitt, P. 131, 185
Huet, F. 136, 146
Huffman, W. E. 28, 36–7
Humphreys, C. 24
- IBM's Open Collaborative Research
program 90
see also open collaborative research
ideology 9, 107–113
see also core principles; cultural
differences; objective function
IFAS (Institute for Food and
Agricultural Standards) 93, 97–8
see also evaluations; Michigan State
University; reviews
impure goods 139, 143–54
control rights 143, 145, 148
definition 143
degree of impurity 144, 145, 148
in developing countries 147
empirical research
infrastructure 147–8
renewable energy 148–52
public goods 133, 136
renewable energy 143–52
theoretical research 144–6
in-house research labs 24
incentives 1–7, 12, 18, 24–9, 35, 39,
44–5, 60–61, 67–8, 72–5, 79–80,
113–14, 132–6, 147, 153, 155, 168,
184, 186–7
incomplete contracts 11, 12, 131–42,
144, 155–6, 158, 161, 184
bundling construction and operation
135
contractual and relational
governance 138
definition 131
empirical research 136–9
prisons 134
private good PPPs 131–33
public good PPPs 132–4, 136
theoretical research 134–6, 161
theory 131–3
see also uncertainty
informal relationships 35–6, 86, 138,
161, 173–5, 181
see also Harvard University;
templates for PPRPs; types of
PPRPs

- information technology (IT) 69–71, 79–80
- infrastructure 13, 133–9, 144, 147–8, 153
- innovation 3, 5, 11–12, 14, 23–4, 27, 65–8, 73, 76–7, 81, 85–6, 89, 103, 134–5, 140–41, 156–7, 161, 164–6, 169–73, 179–80, 184–5, 186–9
see also impure goods; knowledge; patents
- Institute for Food and Agricultural Standards (IFAS) 93, 97–8
see also evaluations; Michigan State University; reviews
- Intel lablets 90
see also open collaborative research
- intellectual property
 assignment of rights 6, 25, 28–9, 74–6, 82, 85, 94, 100, 140, 159, 165, 173, 175, 186, 189
 Bayh–Dole 68–9
 Berkeley–Novartis 94, 96–7
 fragmentation 71–2
see also cross-licensing agreements
 GEUSAP 89–90
 guidelines 100–104, 178–9
 IBM's Open Collaborative Research Program 90
 impure goods 143, 148, 153
 knowledge 71, 74
 law 5–7, 68
 market structure 77–9
 MIT Media Lab 90
 research models 48
 researcher incentives 55–7
 sharing 86
see also types of PPRPs
see also authority; background rights; control premium; control rights; decision making authority; governance structure; licensing; patents; structure of research partnerships
- interest subgroup 110
 organization for collective action 113
 organized and unorganized 112
 research partnership formation 112
see also bargaining; ideology; Nash–Harsanyi framework; Nash cooperative bargaining solution; negotiation
- invention disclosures 32, 35
- Iossa, E. 135–6, 162
- Iowa State University 151–2
see also renewable energy
- Isis Innovation 6
- iso-profit curves 41–2, 48
- IT (information technology) 69–71, 79–80
- Jensen, M.C. 155–6
- Jensen, R. 6, 34, 86, 166
- Johns Hopkins University 6
- Jones, B.F. 25
- Jong, S. 36
- Juan, E. 147
- Just, R.E. 1, 29, 36
- Kalt, J.P. 108
- Kananian, R. 35
- Kaplan, S. 156
- Katz, M.L. 71
- Kau, J.B. 108
- Kealey, T. 18, 23–5, 67, 150
see also paradigms of scientific research
- Kenney, M. 186
- Kerr, N. 27
- Kim, J. 25
- Klotz, C. 27
- knowledge
 assets 65–8, 73–6, 79–80, 162, 175
 complementarity 76
 conservation 75–6
 patents and trade secrets 66
 Bayh–Dole 68–9
 codified 33–4, 66, 70, 74, 162
see also public goods
 creation 65–80
see also innovation
 definition 66
 markets and value 66, 69–73, 77–9
 and natural resource industries 73
 tacit 33–6, 66–71, 73–4, 162–3
see also impure goods; innovation; intellectual property; licensing; patents
- Kuhn–Tucker conditions 115, 121

- Kuhn, Thomas 18–22
see also Kuhn–Tucker conditions
- Kumar, K. 33
- tablets 90–91
see also open collaborative research
- Lach, S. 183
- Lacy, W. 35
- land-grant universities 27–9
see also agricultural science; biotechnology
- Lapan, H.E. 73
- Larsen, M.T. 31–2
- Lau, C. 33
- Lawrence Berkeley National Lab 90, 148–50
see also renewable energy
- Lerner, J. 140, 157, 159
- Leslie, L.L. 185
- lessons 10–11, 87–92, 135–9, 182–9
- Levinthal, D.A. 69
- Lewis, M.A. 137–8, 161, 164
- Lexchin, J. 10
- Li, Y. 185
- licensing 6–7, 12, 32–3, 68, 71–9, 85–90, 133, 152, 159, 164–6, 169–73, 188
- Bayh–Dole 68
- Berkeley–Novartis 94–5, 97–8, 179–80
- Energy Biosciences Institute 149–50
- Global Climate and Energy Project 150
- guidelines 99–103
- merger option 77
- non-exclusive 5
see also innovation; intellectual property; knowledge; patents
- Lim, K. 33
- Link, A.N. 7, 24, 82
- Lissoni, F. 31–2
- local ideal point 42, 45, 55
see also research models
- Louis, K.S. 10, 32
- Lugar–Casey Global Food Security Act 11
- Macho-Stadler, I. 166
- maintained hypotheses 20–21, 25
see also paradigms of scientific research
- March, J.G. 19
- Marco, A.C. 71, 77
- markets for science and technology 69–73
see also knowledge
- Marra, M.C. 27
- Martínez-Giralt, X. 166
- Maskin, E. 131
- Massachusetts Institute of Technology (MIT)
 guidelines 99, 217–35
 Media Lab 90–91
see also open collaborative research
 research and growth 7
- material transfer agreements 87
see also types of PPRPs
- McPherson, M.S. 109
- Meckling, W.H. 155–6
- Medlock, N. 6
- Merges, R.P. 140, 157, 159
- Michigan State University 96–8
see also evaluations; Institute for Food and Agricultural Standards; reviews
- Milgrom, P. 70–71
- di Minin, A. 32
- Missouri Botanical Garden 177
see also Monsanto; Washington University; WU–Monsanto
- MIT (Massachusetts Institute of Technology)
 guidelines 99, 217–35
 Media Lab 90–91
see also open collaborative research
 research and growth 7
- Monsanto 76, 87, 174–82
see also Washington University; WU–Monsanto
- Montobbio, F. 31–2
- Moore, J. 131–5, 144–5
- mousetraps 39–44, 46–8, 50–54, 56–9
see also applied research; private goods; research models
- Mowery, D. 71
- Muthoo, A. 144–6

- mutually optimal conflict strategies 117
see also bargaining; Nash
 cooperative bargaining solution;
 negotiation
- Nash–Harsanyi framework 106,
 110–12, 120, 122
see also bargaining; collective
 choice and decision making;
 cooperative solution; Nash
 cooperative bargaining solution;
 negotiation
- Nash cooperative bargaining solution
 41, 42–3, 47, 53, 105, 115, 123
 independence of irrelevant
 alternatives 106
 individual rationality 106
 linear invariance axiom 106
 Pareto optimality 106
see also bargaining; collective
 choice and decision making;
 cooperative solution;
 Nash–Harsanyi framework;
 negotiation
- National Defence Research Committee
 (NDRC) 21
- National Economic Council 11
- National Institutes of Health (NIH)
 1–3, 17, 22, 33, 85, 99, 164–6, 178
see also guidelines
- National Science Foundation (NSF) 4,
 9, 17, 22–3, 28, 185
see also Defence Advanced Research
 Projects Agency
- natural resources 73, 143–4, 146–7
see also public goods
- Nature* 92, 176
- NDRC (National Defense Research
 Committee) 21
- negotiation 43–8, 55–8, 82–92, 105–7,
 108, 110, 112–13, 141, 157–68,
 187–8
 guidelines 100–103
 leverage 43–5, 55, 177
see also crowding-in and
 crowding-out; Nash
 cooperative bargaining
 solution; research models;
 strategic interactions
see also bargaining; control
 premium; control rights;
 renegotiation; structure of
 research partnerships; templates
 for PPRPs
- Nelson, R.R. 24
- neoliberalism 9
- neutrality
 dynamic research model 55–6
 static research model 45–8
see also non-neutrality
- NIH (National Institutes of Health)
 1–3, 17, 22, 33, 85, 99, 164–6, 178
see also guidelines
- Noma, E. 31
- non-cooperative solution 41, 53, 106,
 115–17, 146
see also bargaining; disagreement
 outcomes; negotiation; threat
 points
- non-neutrality
 dynamic research model 57–60
 static research model 45–8
see also neutrality
- North, D.C. 108–109
- North Carolina State University 88,
 172
see also spinoffs
- Novartis Agricultural Discovery
 Institute (Novartis) 87, 92–9, 174,
 181
see also Berkeley–Novartis;
 College of Natural Resources;
 Department of Plant and
 Microbial Biology; University
 of California, Berkeley
- NSF (National Science Foundation) 4,
 9, 17, 22–3, 28, 185
see also Defence Advanced Research
 Projects Agency
- objective function 52, 110–13, 118–21,
 129–30
see also ideology; Nash–Harsanyi
 framework; Nash cooperative
 bargaining solution
- Office of Naval Research (ONR) 88–9
- Office of Scientific Research and
 Development (OSRD) 21–2
- Olson, M. 113
- ONR (Office of Naval Research) 88–9

- open collaborative research 86–7, 90, 173
see also lablets; research parks; templates for PPRPs; types of PPRPs
- opposition to PPRPs 9, 12
see also conflict and controversies in PPRPs
- OSRD (Office of Scientific Research and Development) 21–2
- Owen-Smith, J. 35
- Oxford 6
- Ozdemir, S. 33
- paradigms of scientific research 25, 67
 conflict between 19
 definitions 18
 linear decomposition research
 paradigm 17–18, 20–23, 31, 60, 67, 186
see also Bush, Vannevar
 non-linear, chaotic, feedback
 research paradigm 18, 23–5, 38–9, 48, 60, 67, 69, 150, 186
see also Kealey, T.
see also Kuhn, Thomas
- Pardey, P.G. 27
- passive strategy 13, 160, 170, 174–5, 187
see also active strategy; bargaining space; templates for PPRPs
- Pasteur, Louis 24
- patents 5–12, 31–4, 66, 77–9, 82–5, 159, 164–6, 186, 188
 Berkeley–Novartis 95–7, 178–80
 blocking 11, 72, 83, 165, 171–2, 178–80, 183–4
 EBI 148–50
 guidelines 88–92, 100–103
 licensing 85–6
 litigation of 7, 69, 72, 85, 165
 publication delay 85, 171
 utility 68–9, 77–9
see also innovation; intellectual property; knowledge; licencing
- PEBB (Power Electronic Building Block) 88–9
- penalty function 118–20, 124–6
see also governance structure
- Pérez-Castrillo, D. 166
- performance function 40–41, 46–8, 52–7
see also research models
- performance separability 46
see also research models
- performance unit 40
see also performance function; research models
- pharmaceutical industry 9–11, 33, 89, 91, 157, 181
 intellectual property rights 140
 knowledge 70–71
- Plant Patent Act of 1930 68–9
see also patents
- Plant Variety Protection Act of 1970 68–9
see also patents
- PMB (Department of Plan and Microbial Biology) 87–8, 92–8, 174–6, 181
see also Berkeley–Novartis; College of Natural Resources; University of California, Berkeley
- Polanyi, M. 65
- policy objective function 52, 110–13, 118–21, 129–30
see also ideology; Nash–Harsanyi framework; Nash cooperative bargaining solution
- Powell, W.W. 35
- Power Electronic Building Block (PEBB) 88–9
- President's Council of Advisors on Science and Technology 3, 11, 89–90, 149
see also case studies
- Press, E. 10, 92, 176, 183
- pressure function 118
see also objective function
- Price, R.M. 93–4, 98
see also Berkeley–Novartis; evaluations; reviews
- Price and Goldman 93–5, 98
see also Berkeley–Novartis; evaluations; reviews
- prisons 134–7
see also control rights; incomplete contracts

- private goods 18, 25–38, 60
 - collective action 113
 - control rights 139, 141
 - knowledge 66–7
 - land-grant universities 27–9
 - model: multi-period 51–60
 - model: single-period 39–51
 - partnerships 131–3, 145–6
 - substitutes and complements 29–33, 36–9
 - tacit knowledge 33–6
 - university research 25–6
 - see also* applied research; impure goods; mousetraps; research models
- production possibilities frontier 40, 52, 56
 - see also* research models
- public goods 1, 15, 18, 27–38, 60–61, 81, 97, 183, 185–6
 - control rights 139–41
 - infrastructure 133–4
 - knowledge 66–8
 - land-grant universities 27–9
 - model: multi-period 51–60
 - model: single-period 39–51
 - partnerships 131–3, 145–6
 - substitutes and complements 29–33, 36–9
 - university research 18, 25–6
 - see also* basic research; impure goods; research models; theorems
- publication delay 10–11, 81, 85, 89, 94–5, 159, 164–5, 171–3, 178–9, 183, 188
 - guidelines 99–103
 - see also* background rights; control premium; control rights; hold-up rights
- Ramamurti, R. 147
- Ranga, L.M. 31–2
- Rasmussen, W. 27
- Rausser, G.C. 1, 10, 19, 29, 71–3, 75, 77, 131, 139, 146, 158, 167
- recommendations 183–9
- renegotiation 132–8, 147–8, 167–8, 181
 - see also* negotiation; responding to shocks; reviewing and renewing the agreement
- renewable energy 143, 148–53
 - see also* Center for Biorefining and Biofuels; Energy Biosciences Institute; Global Climate and Energy Project; impure goods; incomplete contracts
- requests for proposals (RFPs) 13, 84, 88, 96, 151, 163, 186–7
- research agenda 12, 14, 24, 81, 84, 101, 151, 157, 163–4, 170–71, 174–5, 177–8, 184–5, 188
 - call for proposals 84, 163, 172
 - see also* conflict and controversies in PPRPs; conflicting research objectives
- research models 82
 - dynamic 51
 - measuring crowding-in and crowding-out 54
 - neutrality 55
 - non-neutrality 57
 - static 39
 - measuring crowding-in and crowding-out 43
 - neutrality in 45
 - non-neutrality 48
 - see also* mousetraps; theorems
- research parks 7, 172–3
 - see also* open collaborative research; templates for PPRPs
- research units/centers 86–7, 140, 156, 172–3, 175
 - see also* types of PPRPs
- responding to shocks 158, 159, 167–8, 180
 - see also* negotiation; renegotiation; reviewing and renewing the agreement; structure of research partnerships; uncertainty
- reviewing and renewing the agreement 158, 159, 167–8, 180
 - see also* negotiation; renegotiation; responding to shocks; structure of research partnerships; uncertainty
- reviews 93
 - external 96
 - internal 93

- see also* Berkeley–Novartis;
 Center for Studies in Higher
 Education; evaluations;
 Michigan State University;
 Price and Goldman
- reward function 118, 120, 122, 125–6
see also governance structure
- Rey, P. 131
- RFPs (requests for proposals) 13, 84,
 88, 96, 151, 163, 186–7
- Ribozyme Pharmaceuticals, Inc. (RPI)
 89
see also University of Colorado
- risks of partnerships 81–104, 133–4,
 136, 146–7, 161, 170, 181, 184–6
see also benefits of partnerships
- Roberts, J. 70–71
- Robinson, D. 6
- Roehrich, J.K. 137–8, 161, 164
- Rojo-Suarez, J. 134, 147
- Romero, M. 147
- Rosenberg, N. 69
- royalties 5, 28–9, 36–7, 52–3, 60, 68, 74,
 89–90, 100, 149–50, 152, 166, 188
see also intellectual property;
 licensing
- RPI (Ribozyme Pharmaceuticals, Inc.)
 89
see also University of Colorado
- Rubin, P.H. 108
- Ruttan, V.W. 23, 67
- Sadka, E. 146
- Saussier, S. 136–7, 138, 146, 161, 164
- Schacht, W. 5
- Schankerman, M. 183
- Scintillation Materials Research Center
 91–2
- Scotchmer, S. 12, 72, 77, 185–6
- Scott, J. 7
- selection of partners 84, 146, 158–60,
 187–8
see also requests for proposals;
 structure of research
 partnerships
- Shane, S. 170
- Shapiro, C. 71
- Sheridan, C. 13
- Siemens Medical Solutions 91–2
- Silanes, F.L. 131, 134–5
- Simon, L.K. 10, 72, 77, 139, 146, 167
 single or multiple sponsored research
 projects 86
see also types of PPRPs
- Slaughter, S. 185–6
- Small, A.A. 75
- Smeby, J.C. 32
- Soh, P. 33
- Sood, N. 33
- Spagnolo, G. 162
- Spielman, D.J. 146
- spinoffs 86, 88, 161, 170
see also North Carolina State
 University; startups; templates
 for PPRPs; types of PPRPs
- Stanford University 36
 Global Climate and Energy Project
 150
 guidelines 99–102, 236–50
 renewable energy 150
 research and growth 6–7
 research park 172
- startups 7
see also spinoffs
- Steiner, F. 136, 146
- Stevens, A.J. 5
- Stevens, R. 10, 131, 139, 146, 158, 167
 strategic interactions 15, 105–108, 118
see also bargaining; collective
 decision making; Nash
 cooperative bargaining solution;
 negotiation; renegotiation;
 structure of research
 partnerships
- strategic partnerships 82, 86–7,
 170–75
see also Berkeley–Novartis; types of
 PPRPs; WU–Monsanto
- Strategy for American Innovation*
 (Obama Administration) 11
- Stromberg, P. 156
- Strong, J. 147
- structure of research partnerships
 155–82, 185
 economics literature 155
 stage 1 158–61, 176
see also bargaining space
- stage 2 158–9, 161–7, 177–80
- stage 3 158–9, 167, 180–81
- stage 4 158–9, 167–8, 180–81

- see also* responding to shocks;
reviewing and renewing
agreements
- see also* authority; bargaining;
control premium; control
rights; decision making
authority; governance structure;
negotiation
- Stuart, T 32–3
- Subramanian, A 33
- substitutes 17, 29–33, 36, 47
see also crowding-in and crowding-
out
- Sugden, R. 109–10
- Sutherland, D. 138, 164
- Syngenta 94, 181
see also Novartis Agricultural
Discovery Institute
- Taylor, A. 35
- technology licensing 86–7, 169, 179
see also types of PPRPs
- technology transfer offices (TTOs) 6–7,
35, 88, 166, 168
- Teece, D.J. 70, 76–7, 162
- templates for PPRPs 168–75, 182
template one: small, early-stage,
basic research partnerships
169–70, 175
template two: small, later-stage
research partnerships 170, 175
template three: research partnerships
between single private and
single public partner 171–2,
175, 182
template four: multiple partners and
significant resources 172–3, 175
template five: industry and
university in form of informal
gifts 173–5
see also active strategy; bargaining
space; basic research;
informal relationships; open
collaborative research; passive
strategy; research parks;
spinoffs; strategic partnerships;
types of PPRPs
- theorems 39–44, 46–7, 50–60
see also basic research; public goods;
research models
- theoretical research 19, 32–3, 36–8,
134–6, 139–42, 144–6, 153, 155–7,
183–4
- third-party interests 82, 85
- threat points 41–2, 53
see also bargaining; disagreement
outcomes; negotiation; non-
cooperative solution
- threat strategy 120–23, 138, 167,
172
- Thursby, J.G. 32–4, 86, 160, 166
- Thursby, M.C. 6, 32–4, 86, 160, 166
- Tijssen, R.J.W. 31
- Tirole, J. 131, 140, 156, 185
- Toole, A.A. 29–31
- Trujillo, L. 147
- Tsoukas, H. 66
- TTOs (technology transfer offices) 6–7,
35, 88, 166, 168
- von Tunzelmann, N. 31
- types of PPRPs 86–7, 103, 181–2
see also templates for PPRPs
- UC (University of California) 7–8
guidelines 99, 101–102, 251–62
intellectual property 12
Intel 90
- UCSF (University of California, San
Francisco) 9–10
- UIDP (University–Industry
Demonstration Partnership)
91–2
see also guidelines
- UIUC (University of Illinois at
Urbana-Champaign) 90, 148
see also Energy Biosciences Institute;
renewable energy
- uncertainty 11–15, 81, 133, 138, 185,
188
see also incomplete contracts;
renegotiation; responding to
shocks; reviewing and renewing
the agreement
- University–Industry Demonstration
Partnership (UIDP) 91–2
see also guidelines
- University–Industry Partnership 91
see also guidelines; University–
Industry Demonstration
Partnership

- University–Private Sector Research Partnerships in the Innovation Ecosystem* 89
- University of California (UC) 7–8
guidelines 99, 101–102, 251–62
intellectual property 12
Intel 90
- University of California, Berkeley
8, 22, 36, 86–90, 92–9, 148–50, 174–81
Academic Senate 22
see also Berkeley–Novartis;
College of Natural Resources;
Department of Plant and
Microbial Biology; Energy
Biosciences Institute
- University of California, San Francisco
(UCSF) 9–10
- University of Colorado (CU) 89, 151
- University of Illinois at Urbana-
Champaign (UIUC) 90, 148
see also Energy Biosciences Institute;
renewable energy
- University of Pittsburgh Medical
Center 90
see also lablets; open collaborative
research
- University of Tennessee 91–2
- University of Washington 6, 90
- University of Wisconsin Alumni
Research Foundation 7
- university research parks 7, 172–3
see also open collaborative research;
templates for PPRPs
- US Department of Agriculture 3, 102
guidelines 263–78
see also Agricultural Research
Service; Cooperative Research
and Development Agreement
- US Department of Energy (DOE)
102–103, 252, 279–84
see also Cooperative Research and
Development Agreement;
guidelines
- Uzzi, B. 25
- Valila, T. 137
- Van Looy, B. 31–2
- Varian, H. 23
- Vellez, M. 162
- Veugelers, R. 166
- Virginia Polytechnic Institute 88
see also Power Electronic Building
Block
- Vonortas, N.S. 82, 162
- Wang, B. 1
- Wang, C. 146
- Washburn, J. 5, 10, 28, 68, 92, 149,
151–3, 176, 183
- Washington Post 7
- Washington University (WU) 87,
174–81
- Washington University Medical School
(WUMS) 176
- Welsh, R. 35
- Williamson, O.E. 108
- Willis, C. 73
- Working Together, Creating Knowledge:
The University–Industry Research
Collaboration Initiative*, 87, 91,
93
see also Business–Higher Education
Forum
- World Bank Latin American and
Caribbean Studies 134, 147
- Wright, B.D. 166
- WU–Monsanto 87, 174–82
- WU (Washington University) 87,
174–81
- Wuchty, S. 25
- WUMS (Washington University
Medical School) 176
- Wyatt, T.J. 27
- Zheng, J. 137–8, 161, 164
- Zilberman, D. 76, 79, 87, 185
- Zimmerman, E. 31–2
- Zucker, L.G. 6, 33–4
- Zupan, M.A. 108
- Zusman, P. 108

