Stanford

Yoav Shoham

Professor of Computer Science, Emeritus

Bio

BIO

Yoav Shoham is professor emeritus of computer science at Stanford University. A leading AI expert, Prof. Shoham is Fellow of AAAI, ACM and the Game Theory Society. Among his awards are the IJCAI Research Excellence Award, the AAAI/ACM Allen Newell Award, and the ACM/SIGAI Autonomous Agents Research Award. His online Game Theory course has been watched by close to a million people. Prof. Shoham has founded several AI companies, including TradingDynamics (acquired by Ariba), Katango and Timeful (both acquired by Google), and AI21 Labs. Prof. Shoham also chairs the AI Index initiative (www.AIindex.org), which tracks global AI activity and progress, and WeCode (www.wecode.org.il), a nonprofit initiative to train high-quality programmers from disadvantaged populations.

ACADEMIC APPOINTMENTS

- Emeritus Faculty, Acad Council, Computer Science

HONORS AND AWARDS

- Research Excellence Award, IJCAI (2019)

- Fellow, Game Theory Society (2018)

- Feigenbaum Prize, AAAI (2017)

- Allen Newell Award, AAAI/ACM (2013)

- Fellow, ACM (2013)

- Influential Paper Award, AAMAS (2011)

- Best Paper Award, ACM Conference on Electronic Commerce (2010)

- Best Paper Award, ACM Conference on Electronic Commerce (2009)

- Autonomous Agents Research Award, ACM/SIGART (2008)

- Charter member of the Game Theory Society, International Game Theory Society (2008)

- Fellow, Association for the Advancement of Artificial Intelligence (2002)

PROGRAM AFFILIATIONS

- Symbolic Systems Program

PROFESSIONAL EDUCATION

- PhD, Yale (1986)

Publications

PUBLICATIONS

- **On equilibria in games with imperfect recall** *GAMES AND ECONOMIC BEHAVIOR*
  Lambert, N. S., Marple, A., Shoham, Y.
  2019; 113: 164–85

- **Toward the AI Index** *AI MAGAZINE*
  Shoham, Y.
  2017; 38 (4): 71–77

- **Why Knowledge Representation Matters** *COMMUNICATIONS OF THE ACM*
  Shoham, Y.
  2016; 59 (1): 47–49

- **Communication** *MULTIAGENT SYSTEMS: ALGORITHMIC, GAME-THEORETIC, AND LOGICAL FOUNDATIONS*
  Shoham, Y., Leyton-Brown, K., Shoham, Y., LeytonBrown, K.
  2009: 223–39

- **A Distributed Agent for Computational Pool** *IEEE TRANSACTIONS ON COMPUTATIONAL INTELLIGENCE AND AI IN GAMES*
  Archibald, C., Altman, A., Shoham, Y.
  2016; 8 (2): 190-202

- **An axiomatic characterization of wagering mechanisms** *JOURNAL OF ECONOMIC THEORY*
  Lambert, N. S., Langford, J., Vaughan, J. W., Chen, Y., Reeves, D. M., Shoham, Y., Pennock, D. M.
  2015; 156: 389-416

- **Fair Seeding in Knockout Tournaments** *ACM TRANSACTIONS ON INTELLIGENT SYSTEMS AND TECHNOLOGY*
  Thuc Vu, T., Shoham, Y.
  2012; 3 (1)

- **Designing competitions between teams of individuals** *ARTIFICIAL INTELLIGENCE*
  Tang, P., Shoham, Y., Lin, F.
  2010; 174 (11): 749-766

- **Computational Pool: A New Challenge for Game Theory Pragmatics** *AI MAGAZINE*
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- **Multi-Agent Learning II: Algorithms.** *Encyclopedia of Machine Learning*
  Shoham, Y., Powers, R.
  edited by Sammut, C., Webb, G.
  Springer.2010

- **Multi-Agent Learning I: Problem Definition.** *Encyclopedia of Machine Learning*
  Shoham, Y., Powers, R.
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  Springer.2010

- **Cause for Celebration, Cause for Concern.** *Heuristics, Probability and Causality: a Tribute to Judea Pearl*
  Shoham, Y.
  edited by Dechter, R., Geffner, H., Halpern, J., Y.
  College Publications.2010

- **Untitled.** *Epistemic Logic: 5 Questions*
  Shoham, Y.
  edited by Hendricks, V., F., Roy, O.
  Automatic Press / VIP.2010

- **Joint Revision of Belief and Intention.**
  Icard, T., Pacuit, E., Shoham, Y.
  2010

- **Logical Theories of Intention and the Database Perspective** *JOURNAL OF PHILOSOPHICAL LOGIC*
  Shoham, Y.
  2009; 38 (6): 633-647

- **Empirical Hardness Models: Methodology and a Case Study on Combinatorial Auctions** *JOURNAL OF THE ACM*
  Leyton-Brown, K., Nudelman, E., Shoham, Y.
  2009; 56 (4)

- **Ranking games** *ARTIFICIAL INTELLIGENCE*
  Brandt, F., Fischer, F., Harrenstein, P., Shoham, Y.
  2009; 173 (2): 221-239

- **Analysis of a Winning Computational Billiards Player** *21st International Joint Conference on Artificial Intelligence (IJCAI-09)*
  Archibald, C., Altman, A., Shoham, Y.
  IJCAI-INT JOINT CONF ARTIF INTELL.2009: 1377–1382

- **Introduction to Noncooperative Game Theory: Games in Normal Form** *MULTIAGENT SYSTEMS: ALGORITHMIC, GAME-THEORETIC, AND LOGICAL FOUNDATIONS*
  Shoham, Y., Leyton-Brown, K., Shoham, Y., LeytonBrown, K.
  2009: 47–86

- **Distributed Constraint Satisfaction** *MULTIAGENT SYSTEMS: ALGORITHMIC, GAME-THEORETIC, AND LOGICAL FOUNDATIONS*
  Shoham, Y., Leyton-Brown, K., Shoham, Y., LeytonBrown, K.
  2009: 1–17

- **Probability Theory** *MULTIAGENT SYSTEMS: ALGORITHMIC, GAME-THEORETIC, AND LOGICAL FOUNDATIONS*
  Shoham, Y., Leyton-Brown, K., Shoham, Y., LeytonBrown, K.
  2009: 449–50

- **Linear and Integer Programming** *MULTIAGENT SYSTEMS: ALGORITHMIC, GAME-THEORETIC, AND LOGICAL FOUNDATIONS*
  Shoham, Y., Leyton-Brown, K., Shoham, Y., LeytonBrown, K.
  2009: 451–54

- **Classical Logic** *MULTIAGENT SYSTEMS: ALGORITHMIC, GAME-THEORETIC, AND LOGICAL FOUNDATIONS*
  Shoham, Y., Leyton-Brown, K., Shoham, Y., LeytonBrown, K.
  2009: 457–58

- **Computing Solution Concepts of Normal-Form Games** *MULTIAGENT SYSTEMS: ALGORITHMIC, GAME-THEORETIC, AND LOGICAL FOUNDATIONS*
  Shoham, Y., Leyton-Brown, K., Shoham, Y., LeytonBrown, K.
  2009: 87–112

- **Distributed Optimization** *MULTIAGENT SYSTEMS: ALGORITHMIC, GAME-THEORETIC, AND LOGICAL FOUNDATIONS*
  Shoham, Y., Leyton-Brown, K., Shoham, Y., LeytonBrown, K.
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- **Protocols for Multiagent Resource Allocation: Auctions** *MULTIAGENT SYSTEMS: ALGORITHMIC, GAME-THEORETIC, AND LOGICAL FOUNDATIONS*
  Shoham, Y., Leyton-Brown, K., Shoham, Y., LeytonBrown, K.
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- **Teams of Selfish Agents: An Introduction to Coalitional Game Theory** *MULTIAGENT SYSTEMS: ALGORITHMIC, GAME-THEORETIC, AND LOGICAL FOUNDATIONS*
  Shoham, Y., Leyton-Brown, K., Shoham, Y., LeytonBrown, K.
  2009: 367–91

- **Richer Representations: Beyond the Normal and Extensive Forms** *MULTIAGENT SYSTEMS: ALGORITHMIC, GAME-THEORETIC, AND LOGICAL FOUNDATIONS*

Shoham, Y., Leyton-Brown, K., Shoham, Y., LeytonBrown, K.

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- **Protocols for Strategic Agents: Mechanism Design** *MULTIAGENT SYSTEMS: ALGORITHMIC, GAME-THEORETIC, AND LOGICAL FOUNDATIONS*
  Shoham, Y., Leyton-Brown, K., Shoham, Y., LeytonBrown, K.
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- **Aggregating Preferences: Social Choice** *MULTIAGENT SYSTEMS: ALGORITHMIC, GAME-THEORETIC, AND LOGICAL FOUNDATIONS*
  Shoham, Y., Leyton-Brown, K., Shoham, Y., LeytonBrown, K.
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- **Logics of Knowledge and Belief** *MULTIAGENT SYSTEMS: ALGORITHMIC, GAME-THEORETIC, AND LOGICAL FOUNDATIONS*
  Shoham, Y., Leyton-Brown, K., Shoham, Y., LeytonBrown, K.
  2009: 393–419

- **Beyond Belief: Probability, Dynamics, and Intention** *MULTIAGENT SYSTEMS: ALGORITHMIC, GAME-THEORETIC, AND LOGICAL FOUNDATIONS*
  Shoham, Y., Leyton-Brown, K., Shoham, Y., LeytonBrown, K.
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- **Multiagent Systems Algorithmic, Game-Theoretic, and Logical Foundations Introduction** *MULTIAGENT SYSTEMS: ALGORITHMIC, GAME-THEORETIC, AND LOGICAL FOUNDATIONS*
  Shoham, Y., Leyton-Brown, K., Shoham, Y., LeytonBrown, K.
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- **Games with Sequential Actions: Reasoning and Computing with the Extensive Form** *MULTIAGENT SYSTEMS: ALGORITHMIC, GAME-THEORETIC, AND LOGICAL FOUNDATIONS*
  Shoham, Y., Leyton-Brown, K., Shoham, Y., LeytonBrown, K.
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- **Learning and Teaching** *MULTIAGENT SYSTEMS: ALGORITHMIC, GAME-THEORETIC, AND LOGICAL FOUNDATIONS*
  Shoham, Y., Leyton-Brown, K., Shoham, Y., LeytonBrown, K.
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- **Markov Decision Problems (MDPs)** *MULTIAGENT SYSTEMS: ALGORITHMIC, GAME-THEORETIC, AND LOGICAL FOUNDATIONS*
  Shoham, Y., Leyton-Brown, K., Shoham, Y., LeytonBrown, K.
  2009: 455–56

- **Multiagent Systems: Algorithmic, Game Theoretic and Logical Foundation**
  Shoham, Y., Leyton-Brown, K.
  Cambridge University Press.2009

- **Eliciting Truthful Answers to Multiple-Choice Questions Preliminary Report** *10th ACM Conference on Electronic Commerce (EC-2009)*
  Lambert, N., Shoham, Y.
  ASSOC COMPUTING MACHINERY.2009: 109–118

- **Eliciting Properties of Probability Distributions: The Highlights** *SI GECOM EXCHANGES*
  Lambert, N., Pennock, D. M., Shoham, Y.
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- **Fault tolerant mechanism design** *ARTIFICIAL INTELLIGENCE*
  Porter, R., Ronen, A., Shoham, Y., Tennenholtz, M.
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  Shoham, Y.
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- **Simple search methods for finding a Nash equilibrium** *2nd World Congress of the Game-Theory-Society*
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- **Self-Financed Wagering Mechanisms for Forecasting** *ACM Conference on Electronic Commerce*
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- **Mechanism Design with Execution Uncertainty** *UAI-02.*
  Porter, R., Ronen, A., Shoham, Y., Tennenholtz, M.
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- **Essentials of Game Theory: A Concise, Multidisciplinary Introduction**
  Leyton-Brown, K., Shoham, Y.
  Morgan Claypool Publishers.2008

- **Eliciting Properties of Probability Distributions** *ACM Conference on Electronic Commerce*
  Lambert, N., Pennock, D. M., Shoham, Y.
  ASSOC COMPUTING MACHINERY.2008: 129–138

- **Truthful Surveys** *4th International Workshop on Internet and Network Economics*
  Lambert, N., Shoham, Y.
  SPRINGER-VERLAG BERLIN.2008: 154–165

- **A general criterion and an algorithmic framework for learning in multi-agent systems** *MACHINE LEARNING*
  Powers, R., Shoham, Y., Vu, T.
  2007; 67 (1-2): 45-76

- **If multi-agent learning is the answer, what is the question?** *ARTIFICIAL INTELLIGENCE*
  Shoham, Y., Powers, R., Grenager, T.
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- **The Israeli-Palestinian Science Organization** *SCIENCE*
  Wiesel, T., Agre, P., Arrow, K. J., Atiyah, M., Brezin, E., Charfi, F. F., Cohen-Tannoudji, C., Daar, A., Jacob, F., Kahneman, D., Lee, Y. T., Nicolaisen, I., Nusseibeh, et al
  2007; 315 (5808): 39-39

- **Spiteful Bidding in Sealed-Bid Auctions** *20th International Joint Conference on Artificial Intelligence*
  Brandt, F., Sandholm, T., Shoham, Y.
  IJCAI-INT JOINT CONF ARTIF INTELL.2007: 1207–1214

- **A Game-Theoretic Analysis of Strictly Competitive Multiagent Scenarios** *20th International Joint Conference on Artificial Intelligence*
  Brandt, F., Fischer, F., Harrenstein, P., Shoham, Y.
  IJCAI-INT JOINT CONF ARTIF INTELL.2007: 1199–1206

- **On strictly competitive multi-player games.**
  Brandt, F., Fischer, F.
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- **Combinatorial Auctions**
  edited by Cramton, P., Shoham, Y., Steinberg, R.
  MIT Press.2006

- **Non-cooperative computation: Boolean functions with correctness and exclusivity** *THEORETICAL COMPUTER SCIENCE*
  Shoham, Y., Tennenholtz, M.
  2005; 343 (1-2): 97-113

- **On cheating in sealed-bid auctions** *4th ACM Conference on Electronics Commerce (EC'03)*
  Porter, R., Shoham, Y.
  ELSEVIER SCIENCE BV.2005: 41–54

- **Learning against opponents with bounded memory** *19th International Joint Conference on Artificial Intelligence (IJCAI 05)*
  Powers, R., Shoham, Y.
  IJCAI-INT JOINT CONF ARTIF INTELL.2005: 817–822

- **Fast and Compact: A Simple Class of Congestion Games** *AAAI-2005.*
  Ieong, S., McGrew, R., Nudelman, E., Shoham, Y.
  2005

- **New Criteria and a New Algorithm for Learning in Multi-Agent Systems.**
  Powers, R., Shoham, Y.
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- **The structural basis of the thermostability of SP1, a novel plant (Populus tremula) boiling stable protein** *JOURNAL OF BIOLOGICAL CHEMISTRY*
  Dgany, O., Gonzalez, A., Sofer, O., Wang, W. X., Zolotnitsky, G., Wolf, A., Shoham, Y., Altman, A., Wolf, S. G., Shoseyov, O., Almog, O.
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- **Fair imposition** *JOURNAL OF ECONOMIC THEORY*
  Porter, R., Shoham, Y., Tennenholtz, M.
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- **Using contracts to influence the outcome of a game** *19th National Conference on Artificial Intelligence/16th Conference on Innovative Applications of Artificial Intelligence*
  McGrew, R., Shoham, Y.
  ASSOC ADVANCEMENT ARTIFICIAL INTELLIGENCE.2004: 238–243

- **Addressing the Free-Rider Problem in File-Sharing Systems: A Mechanism-Design Approach**
  McGrew, R., Shoham, Y.
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- **SATzilla: An Algorithm Portfolio for SAT** *In conjunction with SAT 2004.*
  Nudelman, E., Devkar, A., Shoham, Y., Leyton-Brown, K., Hoos, H.
  2004

- **Simple search methods for finding a Nash equilibrium** *19th National Conference on Artificial Intelligence/16th Conference on Innovative Applications of Artificial Intelligence*
  Porter, R., Nudelman, E., Shoham, Y.
  ASSOC ADVANCEMENT ARTIFICIAL INTELLIGENCE.2004: 664–669

- **Understanding random SAT: Beyond the clauses-to-variables ratio** *10th International Conference on the Principles and Practice of Constraint Programming*
  Nudelman, E., Leyton-Brown, K., Hoos, H. H., Devkar, A., Shoham, Y.
  SPRINGER-VERLAG BERLIN.2004: 438–452

- **Incentive mechanisms for smoothing out a focused demand for network resources** *COMPUTER COMMUNICATIONS*
  Leyton-Brown, K., Porter, R., Prabhakar, B., Shoham, Y., Venkataraman, S.
  2003; 26 (3): 237-250

- **Boosting as a metaphor for algorithm design** *9th International Conference on Principles and Practice of Constraint Programming*
  Leyton-Brown, K., Nudelman, E., Andrew, G., McFadden, J., Shoham, Y.
  SPRINGER-VERLAG BERLIN.2003: 899–903

- **Towards a General Theory of Non-Cooperative Computing.**
  McGrew, R., Porter, R., Shoham, Y.
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- **On Cheating in Sealed-Bid Auctions.**
  Porter, R., Shoham, Y.
  2003

- **Truth revelation in approximately efficient combinatorial auctions** *JOURNAL OF THE ACM*
  Lehmann, D., O'Callaghan, L. I., Shoham, Y.
  2002; 49 (5): 577-602

- **Dispersion games: General definitions and some specific learning results** *18th National Conference on Artificial Intelligence/14th Conference on Innovative Applications of Artificial Intelligence*

Grenager, T., Powers, R., Shoham, Y.

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- **Smoothing Out Focused Demand for Network Resources** *Short version presented at the 2001 ACM Conference on Electronic Commerce (EC'01); also presented at ITCom 2001. Full version to be published in ACM Computer Communications Review*

  Leyton-Brown, K., Porter, R., Venkataraman, S., Prabhakar, B.

  2002

- **Learning the Empirical Hardness of Optimization Problems: the case of combinatorial auctions** *In Constraint Programming.*

  Leyton-Brown, K., Nudelman, E., Shoham, Y., Vetsikas, Y., Bejar, R., Gomes, C.

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- **Polynomial-time reinforcement learning of near-optimal policies** *18th National Conference on Artificial Intelligence/14th Conference on Innovative Applications of Artificial Intelligence*

  Pivazyan, K., Shoham, Y.

  M I T PRESS.2002: 205–210

- **Bidding clubs in first-price auctions** *18th National Conference on Artificial Intelligence/14th Conference on Innovative Applications of Artificial Intelligence*

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- **Rational Computation and the Communication Complexity of Auctions** *Games and Economic Behavior*

  Shoham, Y., Tennenholtz, M.

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- **An algorithm for multi-unit combinatorial auctions** *17th National Conference on Artificial Intelligence (AAAI-2000)/12th Conference on Innovative Applications of Artificial Intelligence (IAAI-2000)*

  Leyton-Brown, K., Shoham, Y., Tennenholtz, M.

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- **Bidding Clubs: Institutionalized Collusion in Auctions.**

  Leyton-Brown, K., Tennenholtz, M., Shoham, Y.

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- **Towards a Universal Test Suite for Combinatorial Auctions.**

  Leyton-Brown, K., Pearson, M., Shoham, Y.

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- **Taming the computational complexity of combinatorial auctions: Optimal and approximate approaches** *16th International Joint Conference on Artificial Intelligence (IJCAI 99)*

  Fujishima, Y., Leyton-Brown, K., Shoham, Y.

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- **Speeding up ascending-bid auctions** *16th International Joint Conference on Artificial Intelligence (IJCAI 99)*

  Fujishima, Y., McAdams, D., Shoham, Y.

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- **Expected utility networks** *15th Conference on Uncertainty in Artificial Intelligence*

  La Mura, P., Shoham, Y.

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- **On the knowledge requirements of tasks** *ARTIFICIAL INTELLIGENCE*

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- **On the emergence of social conventions: Modeling, analysis, and simulations** *ARTIFICIAL INTELLIGENCE*
  Shoham, Y., Tennenholtz, M.
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- **Economic principles of multi-agent systems** *ARTIFICIAL INTELLIGENCE*
  Boutilier, C., Shoham, Y., Wellman, M. P.
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- **Fab: Content-based, collaborative recommendation** *COMMUNICATIONS OF THE ACM*
  Balabanovic, M., Shoham, Y.
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- **A symmetric view of utilities and probabilities** *15th International Joint Conference on Artificial Intelligence*
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  Shoham, Y.
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- **Two Senses of Conditional Utility.**
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- **Qualitative Reasoning about Perception and Belief.**
  Val, A., Del, Shoham, Y., Maynard-Reid II, P.
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  Shoham, Y.
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- **A dynamic theory of incentives in multi-agent systems (preliminary report)** *15th International Joint Conference on Artificial Intelligence*
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  Koller, D., Shoham, Y.
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- **PROVABLY CORRECT THEORIES OF ACTION** *JOURNAL OF THE ASSOCIATION FOR COMPUTING MACHINERY*
  Lin, F. Z., Shoham, Y.
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- **ON SOCIAL LAWS FOR ARTIFICIAL AGENT SOCIETIES - OFF-LINE DESIGN** *ARTIFICIAL INTELLIGENCE*
  Shoham, Y., Tennenholtz, M.
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- **Knowledge considerations in robotics and distribution of robotic tasks** *14th International Joint Conference on Artificial Intelligence (IJCAI-95)*
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- **Adaptive Load Balancing: a study of multi-agent learning** *Journal of Artificial Intelligence Research 2*
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- **Logics of Mental Attitudes in AI.** *Advances in Knowledge Representation and Reasoning*
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- **Agent Oriented Programming.** *The Encyclopedia of Computer Science and Technology*
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  Delval, A., Shoham, Y.
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