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# Ian Ball

**Address:** Department of Economics
Yale University
New Haven, CT 06520-8268

**Telephone:** (+1) 615-425-6079

**E-mail:** ian.ball@yale.edu

**Web page:** https://sites.google.com/yale.edu/ianball

**Citizenship:** US and UK

**Fields of Concentration:**
Information Economics
Mechanism Design
Game Theory

**Desired Teaching:**
Microeconomics
Game Theory

**Comprehensive Examinations Completed:**
2016 (Oral): Economic Theory (*with distinction)*, Financial Economics (*with distinction)*
2015 (Written): Microeconomics, Macroeconomics

**Dissertation Title:** *Essays on Information Economics*

**Committee:**
Professor Dirk Bergemann (Chair)
Professor Johannes Hörner
Professor Larry Samuelson

**Expected Completion Date:** May 2020

**Degrees:**
Ph.D., Economics, Yale University, 2020 (expected)
M.Phil., Economics, Yale University, 2016
M.A., Economics, Yale University, 2015
B.S., Mathematics, *with distinction and departmental honors,* Stanford University, 2014

**Fellowships, Honors and Awards:**
University Dissertation Fellowship, Yale University, 2019–2020
University Fellowship, Yale University, 2014–2019

Carl Arvid Anderson Prize Fellowship, Yale University, 2017–2018
Cowles Foundation Fellowship, Yale University, 2014–2018
Raymond Powell Prize (for teaching), Yale University, 2016–2017
Charles V. Hickox Fellowship, Yale University, 2014–2017
Phi Beta Kappa (top 2% of class), Stanford University, 2013
Hoefer Prize (for writing in the major), Stanford University, 2011
United States Presidential Scholar (Tennessee), 2010

**Teaching Experience:**

*Yale University*
Fall 2018, Teaching Assistant to Prof. Larry Samuelson, Microeconomics (PhD)
Spring 2017, 2018, Teaching Assistant to Prof. Ryota Ijima, Microeconomics (PhD)
Summer 2015, 2016, 2017, Teaching Assistant to Prof. Truman Bewley, Math Camp (PhD)
Fall 2016, Teaching Assistant to Prof. Truman Bewley, Microeconomics (PhD)
Summer 2015, Mentor for Summer Undergraduate Math Research at Yale

**Research and Work Experience:**

Research Assistant to Prof. Dirk Bergemann, Yale University, 2016–2017
Research Assistant to Prof. Lisa Kahn, Yale University, 2017
Research Assistant to Prof. Johannes Hörner, Yale University, 2015–2016

**Publications:**

"Probabilistic Verification in Mechanism Design" with Deniz Kattwinkel (2019), *Proceedings of the 2019 ACM Conference on Economics and Computation*, pp. 389–390 [extended abstract]

**Working Papers:**

"Scoring Strategic Agents" (November 2019), *Job Market Paper*

"Dynamic Information Provision: Rewarding the Past and Guiding the Future" (May 2019), R&R, *Econometrica*

"Probabilistic Verification in Mechanism Design" with Deniz Kattwinkel (September 2019), *CRC TR 224 Discussion Paper No. 124*, submitted

"Benefitting from Bias" with Xin Gao (October 2019)

"Experimental Persuasion" with José-Antonio Espín-Sánchez (October 2019)

"Checking Cheap Talk" with Xin Gao (September 2019)

**Seminar and Conference Presentations:**

2019: ACM Conference on Economics and Computation
2018: Bonn Theory Reading Group; Columbia Micro Theory Colloquium; Stanford Institute for Theoretical Economics; Econometric Society Summer School (Singapore)

2017: Allerton Conference (UIUC); Stony Brook International Conference on Game Theory; NYU Micro Theory Lunch

**Professional Service:**

Referee: *Econometrica, Quarterly Journal of Economics, AEJ: Microeconomics, Discrete Mathematics*
Organizer: Young Economists Symposium (2017), Yale University

## References

Prof. Dirk Bergemann
Yale University
Department of Economics
New Haven, CT 06520
PO Box 208281
Phone: (+1) 203-432-3592
dirk.bergemann@yale.edu

Prof. Johannes Hörner
Yale University
Department of Economics
New Haven, CT 06520
PO Box 208281
Phone: (+1) 203-432-5352
johannes.horner@yale.edu

Prof. Larry Samuelson
Yale University
Department of Economics
New Haven, CT 06520
PO Box 208281
Phone: (+1) 203-432-6737
larry.samuelson@yale.edu

## Dissertation Abstract

### Scoring Strategic Agents [Job Market Paper]

Predictive scores are increasingly used to guide decisions. Banks use FICO credit scores to set the terms of loans; judges use defendant risk scores to set bail. In general, an intermediary gathers data about an agent's behavior from different sources, and then converts the agent's observable features into a score that predicts a latent characteristic. In FICO scoring, for example, the latent characteristic is creditworthiness, and features include credit utilization rate and credit mix. If a strategic agent understands that she is being scored, however, she can distort her behavior to improve her score, without changing her underlying characteristic. In the presence of such strategic behavior, what scoring rule induces the most accurate decisions?

To address this question, I build a model of scoring. The agent being scored is called the sender. An intermediary commits to a rule that maps the sender's features into a score. A receiver observes this score and then takes a decision. The receiver wants his decision to match the sender's latent characteristic; the sender just wants a favorable decision. On each feature, the sender has an intrinsic level, which is correlated with her latent characteristic. She can separately distort each feature away from its intrinsic level, at a cost. Her intrinsic levels and distortion costs are private information.

As a benchmark, suppose there is no intermediary, and the receiver observes the sender's features. Thus, the sender and receiver play a signaling game, with features as signals. The cost of distortion is heterogeneous, so in equilibrium different sender types distort by different amounts. Therefore, the receiver cannot determine the intrinsic level of each feature.

I show that the scoring intermediary can improve the receiver's decisions by mitigating a commitment problem. The receiver, if he could, would like to commit to making his decision less sensitive to the sender's features. In response, the sender would distort her features by less, making them more informative. But then, ex post, the receiver would prefer to fully incorporate these features into his decision.

Under the optimal scoring rule, the receiver's decision underweights some features and overweights others. A feature gets less weight if the ability to distort that feature is more heterogeneous. If the receiver could observe the sender's features, he would change his decision, but from the score alone he cannot disentangle the contribution of each feature. Relative to the benchmark without the intermediary, the sender's features are more informative and the receiver's decision is more accurate. In the face of manipulation, disclosing less can reveal more.

**Dynamic Information Provision: Rewarding the Past and Guiding the Future**

I study information provision as an incentive instrument in a long-term relationship. A sender and a receiver interact over an infinite horizon. The sender observes an exogenous payoff-relevant state, which follows a diffusion process. The sender commits to a dynamic information policy. At each time, the sender sends a signal to the receiver, who chooses a public action that affects the welfare of both players. I solve for the sender's optimal policy in closed form: the sender reveals the value of the state with a delay that shrinks over time and eventually vanishes. Even when the receiver knows the current value of the state, the sender retains leverage by threatening to not reveal the state's future evolution.

**Probabilistic Verification in Mechanism Design**, with Deniz Kattwinkel

We introduce a model of probabilistic verification in a mechanism design setting. A principal has access to a family of pass–fail tests. The agent's probability of passing each test depends on his type. The principal verifies the agent's claims by conducting a test. Unlike previous verification models, the revelation principle holds. We give a necessary and sufficient condition on the passage probabilities under which each type has an associated test that best screens out all other types. Under our condition, the testing technology can be represented in a tractable reduced form. In a quasilinear environment, we solve for the revenue-maximizing mechanism by generalizing the notion of virtual value to incorporate testing. As testing varies from uninformative to perfectly revealing, our virtual value increases from Myerson's virtual value to the agent's true value.