

January 12, 2016

To: AAAS Board Chair Gerald Fink, President Geraldine Richmond, CEO and Publisher of Science  
Rush Holt, AAAS Board and Council Members and Colleagues:

From: Lloyd Etheredge <sup>1</sup>

Re: **A Code of Journalistic Ethics for Science; Recruiting an Outstanding Editor-in-Chief**

This memorandum outlines the case for AAAS to adopt a journalistic code of ethics for Science similar to the Boston Globe standard (discussed below and informing the recent movie, Spotlight). Your support for a professional code of ethics will help to recruit a new Editor-in-Chief of Science of the highest caliber. AAAS has conducted a damaging national experiment, across several decades in an increasingly politicized Washington environment, to operate Science without such a code. It is time to look at the evidence and to re-learn system-level lessons about the wisdom of an independent and vigilant press and its vital role to maintain the accountability, integrity, and performance of institutions like the National Science Foundation. In this perspective, the Editor-in-Chief job at Science is one of the most important jobs in the world.

## Science and the Experiment of Silence

As a nation, we built a trustworthy system for scientific progress: academic tenure at universities, the National Science Foundation as an independent agency, guarantees for Scientific Merit, independent, peer-review awards. However, NSF secretly ended the standard of Scientific Merit, peer-review awards for the social sciences and, since the Great Society years, has curtailed lines of investigation that might challenge conventional wisdom or political agendas. One brutal cost of the *de facto* Too Hot to Handle list has been to impose, on Americans and billions of people worldwide, a stagnation of economic science (problems, known for many years, that are documented by the Congressional Budget Office data that I brought to your attention in “The Optimistic Case for Rapid Learning Economics,” pp. 1-2.) <sup>1</sup>

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<sup>1</sup> Lloyd Etheredge is Director of the Government Learning Project at the Policy Sciences Center, Inc. a public foundation created in New Haven, CT by Harold Lasswell, Myres McDougal and George Dession in 1948. URL: [www.policyscience.net](http://www.policyscience.net); [lloyd.etheredge@policyscience.net](mailto:lloyd.etheredge@policyscience.net); (301)-365-5241 (o).

Science made a policy decision (without public disclosure) to remain silent. This has been a sore point for social scientists. We needed – and I believe that we deserved - accurate reporting in Science to defend our rights and build a well-informed movement to continue scientific progress. People assumed that, if our complaints were legitimate, Science would have sounded the alarm. Former AAAS President David Hamburg addressed these issues in a meeting with senior NSF officials under the auspices of his Carnegie Commission on Science, Technology, and Government: the enclosed letter from the former Editor-in-Chief of Science Donald Kennedy documents his awareness of this Commission engagement and a decision – reaffirmed several times by CEO Alan Leshner and Senior Editorial Boards of Science – to remain silent. <sup>2</sup> [My incoming letters had urged Kennedy to reconsider this silence, for example in the light of the use of linear regression applied to quarterly historical data by econometricians. Too much data was being lost and, in a changing world, future equations would become less reliable without a quick fix being available.]

## The Boston Globe Standard

For the country and the world, a better model is the Boston Globe professional standard in Spotlight. The sexual abuse of children by trusted Catholic priests was a very different betrayal but the same principles of journalistic independence, duty to the public, and ethics apply and they produce needed change. In earlier years the Boston Globe remained silent because the Catholic Church was a powerful and important institution that brought benefits to people in Boston. At first, the Boston Globe also believed that: 1.) Violations were rare and the acts of isolated individuals; and 2.) Catholic Church officials in Boston honored, at least at their highest levels, a compelling obligation to ethical values and to victims and moved swiftly and responsibly to solve any problems. When he began to learn the truth, the Boston Globe's Editor made the right journalistic decision: Don't get into "cat fights" about individual cases, go after the institution, the system level, and the people at the top. Now, with the lives of Americans and billions of people worldwide injured by unreliable NSF economic science and a multi-decade suppression scandal with full knowledge and complicity at the top, it is time for similar investigative reporting.

Even if NSF's programs and moral credibility cannot be restored quickly, we urgently need honesty and candor so that Trustees of research universities, foundations, and philanthropists can be alerted to replace public funds for social science. There is a compelling ethical obligation to inform other nations

(about 60) who are members of the Global Research Council about the undisclosed and unexpected political lockdowns of NSF macroeconomics research, still continuing in 2016, so that they, too, can compensate and act in their own best interest.

## Investigative Journalism by Science: Further Cases

There are other, cumulative, red flags at NSF that are candidates for investigative reporting by Science. Aside from normal waste, fraud, and abuse, the productivity of the national science budget, the nature of our non-profit universities, the incentive systems of science, and (potentially) the moral credibility of scientific self-governance are being damaged. The problem is that, when NSF (uniquely among Washington scientific institutions) ended its commitment to Scientific Merit, peer-review grants, it attracted armies of paid consultants and lobbyists to exploit its weakness.

### 1.) Hucksterism and Non-Performing NSF Grants: The Big Short

During the George W. Bush Administration, people who wanted a larger share of NSF's multi-billion-dollar budget used the same strategy that was underway on Wall Street. The current movie, The Big Short, shows how hucksters combined highly rated, trustworthy AAA home mortgages into "derivative" packages with less reliable elements. At NSF, the Scientific Merit ratings became the new AAA front-end of a "Merit" NSF package, secretly adjusted by adding "junk" political pay-off grants without a reliable rating system. [The NSF Director no longer allows Congress and the public to "buy" a Scientific Merit grant program.] The National Science Board (that brought the ethics of Texas politics to NSF) went even further: rather than require academic institutions to cost-share in new scientific facilities and Centers (a traditional rule to assure more reliable performance), the National Science Board ordered NSF to remove its cost-sharing requirements. This is the equivalent of Wall Street arranging to add No Money Down, No Monthly Payment mortgages into derivatives with the AAA mortgages.

I have raised these questions in the enclosed letter to President Geraldine Richmond in her dual capacity as a member of the National Science Board. As soon as Science adopts the Boston Globe standard, and secures answers to these questions, I expect the moral credibility of the NSF "Merit" system to collapse. The best analyst in The Big Short warned that complex, confusing, and opaque systems were red flags for exploitation, corruption, and unreliability. NSF's stonewalling suggests that the NSF Director and National Science Board (including Dr. Richmond) already know what the answers are.

## 2.) “Big Profit” Incentives and System-Level Damage

“Institutional flaws are best prevented, because they are hard to fix. Once an institutional structure is in place, people quickly acquire a vested interest in its preservation. The flawed structure then becomes surprisingly resistant to reform, as the US health-care system clearly demonstrates.”

- Lim, Porter, Romer and Spence <sup>3</sup>

If it applies the Boston Globe standard, Science also has a potential Pulitzer Prize and game-changing civic contribution by pursuing the disclosures in Nature (that I brought to your attention) about the sleight-of-hand system, approved by the National Science Board, to use an HHS “cut-out” and guarantee large and excessive overhead rates without individual audits. The behind-closed-doors scheme was promoted to “incentivize” university-based science and produce more rapid growth than first-ranked universities were willing to do by expanding their tenured faculty. A stack of recent books raises alarms about damaging changes at American universities. The causal pathway begins here.

Investigators are likely to find that this new Republican-era system actually has reduced the productivity of the NSF science budget. Earlier, the NSF partnership model was to buy research at the margin (with faculty salaries being paid substantially by universities through traditional teaching/tenure-track positions). The new “profit-based incentivizing” system encourages interested fast-track universities to act like shopping mall developers. The full cost of their salaries and benefits, real estate and buildings, plus generous “free money” overhead/ Profit Center payments are to be raised by non-tenure-track employees themselves through NSF grants. The “hungry mouths to feed” employment system floods NSF with grant applications (requiring about 200,000 Scientific Merit reviews/year). The only known benefit is that Administrations live well – and they have nothing at risk and it costs them nothing. [Like recent, Wall Street hustlers, the gains are privatized while the risk is shifted to the public.] Science is likely to find a growing number of safe, low-risk, and non-performing grants flooding the system, at higher cost.

One of the world’s most successful (honest) investors, Warren Buffet, tells his employees: *“We must continue to measure every act against not only what is legal but also what we would be happy to have written about on the front page of a national newspaper in an article written by an unfriendly but intelligent reporter.”*<sup>4</sup> I think that there is a linkage across these breakdowns and red flags: It would have been best to stop these erosions quickly, when they began. Without the deterrence of public accountability via Science and the Boston Globe standard, the (likely, illegal) hucksterism and “free money” overhead payment systems helped to shift the composition, culture, and focus of attention of the National

Science Board. Instead of being a Vannevar Bush body of eminent scientific statesmen with a New England conscience, it moved toward being an accommodating coalition with for-profit institutions and interest group representatives (and encircled by skillful political actors with agendas to get around Scientific Merit awards). New members began to think of Bush-era practices as a *fait accompli* accepted by the majority. When they have conflicting interests and cannot accomplish anything alone, human beings remain silent, self-correction mechanisms weaken, and eventually an increasingly dysfunctional system has a deep and urgent need for independent, honest journalists with a Boston Globe professional standard.<sup>5</sup>

#### Attachments

- Letter from Donald Kennedy to LSE, August 4, 2006
- LSE, Letter to AAAS President and NSB Board Member Geraldine Richmond, April 9, 2015
- LSE, "The Optimistic Case for Rapid Learning Economics," November 2015

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<sup>1</sup> There is a longer list of dead bodies and lockdowns of the use of social science for societal learning. For example, 1.) National security: the US has fought three unwinnable trillion dollar wars with the same scenario. And is beginning a fourth, still with the NSF post-Vietnam lockdown. 2.) Republican libertarian ideas still are denied an Honest Broker hearing, a stupid decision that increases Republican mistrust of science and contributes to angry, evidence-free, politics. Making the normal range of disagreements between Republicans and Democrats into a Too Hot to Handle problem has a chilling effect. 3.) The Primate Subordination Syndrome from neuroscience may contribute transformative insights into the mystery of unsolved and resistant social, behavioral, health, economic and educational problems affecting lower status human population – at least, this is possible when NSF stops treating the ideas like a potentially exploding hand grenade. 4.) NSF has had an unwritten rule against funding studies of racism and the effects of racism – and it has not had the ethics to inform universities who are trying to create incentives and careers for more Black faculty members. 5.) There are new scientific opportunities for community-based rapid learning systems to improve most state and local government programs (e.g., [www.apqc.org](http://www.apqc.org)) that do not require battles, as NSF has imagined, about the proper role of the federal government.

The deeper lesson is that Runnymede was a good idea: decisions made by truly independent peer review juries are essential. When government officials must sign-off on lines of investigation, the results – even at agencies with the earlier moral credibility and trustworthiness of NSF – soon become unsatisfactory.

<sup>2</sup> Re professional ethics and conflicts of interest: AAAS officials have unwisely chosen to hold office simultaneously on the National Science Board [e.g., President Geraldine Richmond is about to become AAAS Chairman and former CEO and Science Publisher Alan Leshner has been an NSB member for a dozen years). Since AAAS is the publisher of Science, they thereby create a chilling conflict of interest that sup-

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presses candid reporting of their voting and other work in these public roles and of growing NSF problems and subterfuge policies. Understandably, the best candidates to be the new Editor-in-Chief of Science might find these dual office conflicts and the duress and chilling effects on staff news reporters to be unacceptable. It might be wise for a successful candidate to secure an entering agreement for an Ombudsman system to help resist any future Team Player pressures and, perhaps, to secure Dr. Richmond's resignation from one of her positions.

<sup>3</sup> Edwin Lim, Ian Porter, Paul Romer, and Michael Spence, Medium and Long Term Development and Transformation of the Chinese Economy: A Synthesis Report. March 2011. (Online at [www.cairncrossfund.org](http://www.cairncrossfund.org)), p. 71.

<sup>4</sup> Shira Ovide, "Warren Buffet on Ethics: We Can't Afford to Lose Reputation," The Wall Street Journal, March 31, 2011. Online: <http://blogs.wsj.com/deals/2011/03/31/warren-buffett-on-ethics-we-cant-afford-to-lose-reputation/>

<sup>5</sup> The Big Short includes a scene with a Wall Street Journal reporter who remained silent. The 2008 catastrophic failure of econometric models also was a national and international failure of business-as-usual /no investigative reporting journalism.



August 4, 2006

Dr. Lloyd Etheredge, Director  
Government Learning Project  
The Policy Sciences Center, Inc.  
127 Wall Street, Room 232  
P.O. Box 208215  
New Haven, CT 06520-8215

Dear Dr. Etheredge,

Thanks for your letter of July 11 and for several <sup>additions</sup> ~~editions~~ that have followed. I've known for some time, both because of my service on Dave Hamburg's Commission and because you've written me from time to time, of your concern about the social, behavioral, and economic sciences at NSF and at the Academies. I don't think this is an area in which the AAAS, through its elected Board of Directors is likely to take a position. On the other hand, the News department at *Science* is always interested in issues relating to how the scientific community is served (a being treated by government or by other entities). I'm forwarding a copy of your letter to Colin Norman, the news director, so that his staff can be made aware of this concern.

With best regards,

Sincerely yours,

Donald Kennedy  
Editor-in-Chief

DK/jw

# THE POLICY SCIENCES CENTER, INC.

Project Director: DR. LLOYD ETHEREDGE  
7106 Bells Mill Rd.  
Bethesda, MD 20817-1204  
Tel: (301)-365-5241  
E-mail: [lloyd.etheredge@policyscience.net](mailto:lloyd.etheredge@policyscience.net)

April 9, 2015

President Geraldine Richmond  
AAAS  
1200 New York Ave., NW  
Washington, DC 20005

Dear President Richmond:

In your dual capacity as AAAS President and as a member of the National Science Board (with oversight responsibility for the National Science Foundation) would you obtain basic accountability data from NSF and publish the answer to three questions in Science within 60 days? AAAS needs to make decisions about how to restore the Scientific Merit, peer-review system. Well-informed (and perhaps confrontational) decisions, with Council and membership support, require accountability data that NSF has been unwilling to disclose.

Here are the three questions that I hope you will answer publicly:

- 1.) Comparing Outcomes. Comparing the rankings and outcomes of peer-review Scientific Merit sub-scores to the final outcomes of NSF's Merit Review competition in Washington, what difference is the new system producing? How much are we talking about? How much Scientific Merit money is NSF-Washington redistributing? What specific criteria are being given the most weight? What institutions, in what Congressional Districts, receive the largesse?
- 2.) Consistency, reliability and validity by scientific standards. By what objective measures (of consistency and reliability) do you accept the new Merit Review competition scorings of the NSF bureaucracy and senior administrators as trustworthy? And by what measures (i.e., unless you accept the declared purpose and amount of the expenditures as evidence) do you trust these new scores by NSF Director Cordova and NSF-Washington as valid scientific predictors of the actual societal benefits that this Merit system claims to produce?
- 3.) Bureaucratic Behavior and Political Censorship. The National Science Board has received concerns and evidence that NSF-Washington improperly uses its new power to censor topics in the social sciences - including Honest Broker tests of the Republican "Ayn Rand novel" theory of economics; studies of racism; potentially transformative theories from neuroscience (e.g., of an induced Primate Subordination Syndrome); new data systems to question and improve upon the

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URL: <http://www.policyscience.net>

assumptions and economic science used by the Obama Administration for recovery and behavioral assumptions in Middle East politics and unwinnable wars. The political censorship issues were lost in the Leshner *et al.* Report that only described “confusion” about Merit Review and did not address issues of bureaucratic fear.

Where do things stand? Are there areas for political censorship by NSF Director Cordova and her subordinates that are currently legitimate in the eyes of NSF and the National Science Board - i.e., given that you are accountable?

### Discussion

I wrote to the National Science Board on January 18, 2015 about the issues in questions 1 and 2; I enclose a copy of the letter that will remind you of the background and grounds for concern. In this Open Letter, with a request for your response in Science, may I suggest several further considerations about breakdowns and threats that the scientific community needs to engage?

- The null hypothesis of political corruption: Especially since the NSB Membership and Chairmanship of Dr. Bowen, the former President of Texas A&M, the NSF Merit Review system has evolved as a brutal zero-sum game. In reality, it quietly kills Scientific Merit awards and redistributes largesse to a certain class of universities and political constituencies by ordering bureaucrats to alter Scientific Merit rankings without public disclosure of the details. The cumulative legislative guidance of the National Science Board has grown to several dozen rules and program goal statements of favoritism and euphemisms for redistribution (e.g., “increasing participation”) that are indicative of the ethics of Texas politics.<sup>1</sup> Behind the rhetorical flim-flam, the so-called Merit Review system of NSF-Washington biases NSF *against* Scientific Merit research awards and research applications from scientists at the nation’s best universities.<sup>2</sup> This may be damaging scientific innovation and progress. There is a calculated exploitation and betrayal of the nation’s research scientists who voluntarily donate 200,000 Scientific Merit reviews of 50,000 applications/year and, with trust, lend their credibility to the new NSF-Washington system. There is danger to the sterling reputation of NSF, its moral credibility, and to public support for the national science budget. There is evidence that NSF Program Officers have fought back, to retain the integrity of Scientific Merit awards, but we do not know how much damage has been done.

- About illegality and government trustworthiness: You and other members of the National Science Board do not appear, from the public record, to have been briefed about the Administrative Procedure Act of 1946. It is fundamental to public administration and to a government run by law. It has been called “the Bill of Rights of those who do business with the government” and NSF’s operation of the Merit Review system (as Leshner *et al.* discovered several years ago) is illegal. There are two dozen+ NSB-legislated scoring rules and guidelines and language prescribing specific favoritism and priorities for program goals – often adopted without the required public notice or comments. The scoring in the NSF-Washington system of 50,000 competitive

grants/year must be consistent and fair and by standards that are agreed upon across judges and fully disclosed, with clarity and specificity, to all applicants and the public. The Administrative Procedure Act of 1946 also applies to independent agencies like NSF. Naming two “broad-brush” scoring categories on a Website is not even close to what federal law requires. If, by now, NSF-Washington still evades computing measures of consistency and reliability and if auditable records for the Merit Review scorings by NSF Program Officers are missing or unclear or incomplete, then everybody at NSF and the National Science Board accountable for this system must be removed, beginning at the top. In a federal agency spending \$7.8 billion/year, this is not an “Oh golly! We didn’t know” problem.

The rule of law also requires that all of the cumulative legislation of the National Science Board and specific scoring guidelines in NSF documents and Web pages be codified, published, and easily accessible to everybody. We also expect a written record showing how terms are defined and applied.<sup>3</sup>

- About rhetorical obfuscation and stone-walling: If, in a democracy, full NSF transparency and disclosure can make people angry and energize political forces to over-turn policies or remove senior officials or Program Officers, then it is a civic imperative that NSF disclose the data. The Scientific Merit victims of the new NSF-Washington system whose research is being defunded have a right to be told and to organize against you. The integrity of the democratic process must be respected. This is a primary duty of the National Science Board.

- About political censorship: NSF has blocked, for more than 30 years, any Honest Broker data system to respect and evaluate the Republican “Ayn Rand novel” theory of economic growth. We have Presidents (Reagan) and Presidential campaigns with leading GOP contenders (e.g., Mitt Romney, now Rand Paul) who sincerely believe this model and the AEA-member economist and former head of the Federal Reserve, Alan Greenspan, has written a book to advocate these theories and measures.<sup>4</sup> Motives of different Republicans differ (I have followed these issues for 30+ years), but one Republican perspective is that social scientists at elite institutions like Paul Krugman jeer down at Republicans, from the ramparts of NSF and the shield of an (“alleged”) Scientific Merit review system run by academic liberals. If you were a Republican libertarian, and your theories were stonewalled by NSF, blocked from testing, and kept from academic social science textbooks, you would be very angry about NSF social science too. NSF-Washington and its censorship practices have been creating great trouble for the social sciences and for the country. And they are an international embarrassment.

May I suggest that the National Science Board immediately order the NSF Director to implement an Honest Broker, rapid learning system about these ideas? Commission a National Academy of Sciences/National Research Council panel to design – with full participation and the best scientific methods – the Honest Broker data system, research program, and a scientific competition modeled on the Michelson-Morley experiment in physics. Perhaps Paul Krugman will learn

something? Or Rand Paul? You can create a refreshingly better future for the social sciences, our political system, economic policy, and the country.

Yours truly,



Dr. Lloyd S. Etheredge

Cc: AAAS Executive Board, Council and Section Officers, Alan Leshner

Enclosure: LSE, Letter of January 18, 2015 to the National Science Board, with attachments.

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<sup>1</sup> One statement of NSB legislation enacted to get around the Scientific Merit system reads: “NSF promotes **broadening participation** in science and engineering fields. . . . This also includes increasing diversity in the NSF portfolio with respect to types of institutions supported and the geographic regions represented.” Online at [http://nsf.gov/bfa/dias/policy/merit\\_review/facts.jsp](http://nsf.gov/bfa/dias/policy/merit_review/facts.jsp).

<sup>2</sup> Members of the scientific community may be surprised by how NSF-Washington has been operating. For example, competitive anger was openly expressed in the NSB legislation – still on the books – that orders NSF Program Officers to censor information about institutional cost-sharing and remove it from the review process. The rule (discussed in my earlier letter), passed by administrators and former administrators from a certain kind of university, was intended to divert NSF awards from our nation’s best universities that were able, and willing, to put their own funds at risk behind new projects and to raise other money to make a project a success. [In these cases your answer to question 1 cannot measure the effects of the rule, but would you list the cases where this censorship of applications has been applied?

As you will recognize the international Principles of Scientific Merit review were written to block this kind of “participation in science” corruption. Nobody disputes the right of Congress to appropriate scientific research money legally *as pork barrel politics* but – since the Congressional processes can be blocked by Congressmen from competing constituencies – this is seldom tried in science. The political corruption occurs when frustrated university members of the National Science Board exceed their legal authority and seek to manipulate a trusted, competitive scientific grants award process in a public agency.

<sup>3</sup> This includes, for example – assuming a scale of 0 to 100 with up to 60 points awarded for Scientific Merit - whether a Program Officer applying the “geographic distribution” rule behind closed doors in NSF-Washington adds up to 3 points, or up to 30 points, when NSF and NSB language designates this as an “important” goal that it encourages.

<sup>4</sup> At one level, many psychologists and most people probably agree with this idea about strong and healthy individuals. I.e., as an “if . . . then” proposition, people’s lives will work better if they come from a framework of responsibility. They will be more motivated, think about what they are doing, and make better decisions than if they think of themselves as victims or wait for somebody to give them something that is missing. Individual lives will work better and so will the economy. The challenging social science question is how this personality-system dynamic is linked, if at all, by various people to public dramas of citizen-government relations and successful economic policy and to other system-level dynamics in the 21<sup>st</sup> century?

# THE POLICY SCIENCES CENTER, INC.

Project Director: DR. LLOYD ETHEREDGE  
7106 Bells Mill Rd.  
Bethesda, MD 20817-1204  
Tel: (301)-365-5241  
E-mail: [lloyd.etheredge@policyscience.net](mailto:lloyd.etheredge@policyscience.net)

January 18, 2015

Dr. Dan Arvizu, Chair and Members  
National Science Board  
4201 Wilson Blvd.  
Arlington, VA 22230

Dear Dr. Arvizu and National Science Board Members:

NSF's moral legitimacy is based on the reality and perception of a politically-independent, peer-review Scientific Merit system. I hope that you will return to this system. I write to recommend that the National Science Board seek a wider range of legal opinion about NSF's changed system, now with revisions described in Press Release 14-163 of December 3, 2014 (attached).<sup>1</sup> This letter brings to your attention three legal barriers to what NSF is doing.

[One of these three legal barriers (# 2, below) concerns the failure of the NSF Director and her senior management teams to meet government legal standards for consistent and fair scoring, by criteria that are fully and clearly disclosed in advance, for 49,000+ applications/year. The inference that a disqualifying problem exists is based on strong *prima facie* evidence assembled by a private contractor for the National Science Board. On the basis of this evidence (discussed below, with excerpts attached to this letter), I ask you to provide the American Association for the Advancement of Science's Council, prior to its meeting next month, with standard metrics showing NSF's current achievement for standards of consistency and quality control and the actual decision algorithms, scoring, and weights that NSF is using (and their variability). The null hypothesis is that NSF has been mismanaging its new scoring system, abusing its discretionary power, failing to keep complete, auditable records and standard metrics of consistency, ignored the legal and ethical requirements for its new system, and broken faith with the scientific community.]

**1.) Problems Of Missing Expertise.** As described in the December 3, 2014 Press Release, NSF's changed system uses its employees to alter peer-reviewed Scientific Merit competitive rankings and awards based on their predictions of a project's contributions to broad program goals of "the national health, prosperity and welfare; or to secure the national defense." You may not do this. Federal law requires that competitive grant or contract awards be judged, with consistency and reliability, by civil servants with established and recognized expertise to make the judgments. There may be specific exceptions but, in general, NSF's employees only have established and recognized expertise to make judgments of Scientific Merit (i.e., with doctorates in their field).<sup>2</sup>

- I note this legal barrier also because (as discussed in the following section) this high-minded "program goal" rhetoric about Broader Impacts belies the reality of NSF's politicized system for forecasting

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and scoring Broader Impacts. NSF's actual Broader Impacts system includes numerous "specific, desired societal outcomes," a cumulating universe of many scoring rules, interest group favoritism, and competing, lobbyist-promoted theories (often, doubtful) about how to achieve the high-minded goals.

**2.) Problems of Consistency.** Federal law expects government agencies to achieve consistency in their competitive evaluation of grants and contracts and to disclose their scoring system (clearly, fully and in detail) in advance to all applicants. However, no NSF Director has ever demonstrated that the new ratings by Program Officers and higher officials achieve consistency by accepted metrics. To the contrary: in 2011 the National Science Board commissioned a private contractor to do a preliminary study (based on self-reports and survey research) of whether inconsistency, unreliability, and unfairness problems existed, because it was *"aware of persistent anecdotal reports about confusion related to the Broader Impacts criterion, and inconsistency in how the criterion was being applied."*<sup>3</sup> The attached (confirming) excerpts from the Report present the best available evidence from NSF's own senior managers (when they were offered anonymity) about how the applications from the nation's research scientists and universities actually have been treated by a trusted scientific institution.

[Normally, with such alarming evidence, the National Science Board - as NSF's Board of Directors - would be expected to act with due diligence and commission an immediate independent, direct audit of the actual scoring and to demand standard metrics to monitor NSF compliance with legal expectations. For example, these could include inter-judge consistency established by training programs and monitored by frequent quality-control samples tested against rankings of independent Expert judges.)]

However, insoluble difficulties may arise because NSF's actual Broader Impact scoring formally requires Program Officers and their superiors to award points and weights for "the achievement of specific, desired societal outcomes."<sup>4</sup> An examination of NSF's new scoring system shows that almost everybody who supports the national science budget has been promised that their goals and interests are "specific, desired societal outcomes." Lobbyists, behind closed doors, also have quietly and cumulatively secured restrictive rules to achieve competitive advantages. The NSF system, egregiously, dumps all of the promises, and many of the contradictory and competing demands of a pluralist political system, onto the desks of the civil service. Program Officers are unfairly placed under duress and can be criticized, if there is transparency and accountability, for the conflicting promises of their superiors and specific scores and weights Program Officers are revealed to assign to different societal outcomes and group interests.

For example:

- A new Program Officer evaluating competing proposals, including a proposal from Texas A&M for a new Center for Excellence, will [in addition to a.) Required Scientific Merit scoring issues] discover a universe of different Broader Impact scoring instructions from your National Science Board - e.g., that b.) A *"primary goal [sic] of NSF is to expand the participation of individuals and institutions,"* coded language that traditionally means that he/she should add points and tilt in favor of peripheral institutions like Texas A&M. Also, there will be guidance from NSF superiors that its Program Officers should be mindful of balanced portfolios across many dimensions, including c.) A "geographic distribution" of awards - a euphemism that, again, could enjoin an added

score for Texas A&M's application. However the Program Officer also will find a requirement to achieve "balance" by using d.) "Manpower needs" to score and weight applications, a countermove in the politics of the national science budget and coded language that typically means that peripheral Texas A&M applications must generically be ranked lower than the applicants from leading research universities who use NSF grants to hire Research Assistants and pay for the education of more, and possibly better, future research scientists.<sup>5</sup>

- Similarly: An honest professional assessment of whether Texas A&M just wants the money, or is genuinely committed to building a Center for national excellence, might include the scoring criteria of whether Texas A&M is putting any of its own money at risk. However the Program Officer will encounter a restrictive National Science Board rule that e.) He/she may not ask cost- and risk-sharing questions when scoring the merit of proposals from different institutions.<sup>6</sup> Or, again: if Texas A&M claims that the new Center's work will contribute discoveries that can benefit economic growth, the Program Officer will find another scoring rule that f.) Claims about the benefits of limited projects in lines of scientific investigation can only be judged in the aggregate: thus, the absence of persuasive evidence for applicant claims about Broader Impacts cannot be used to disbelieve the claims when a Program Officer assigns merit scores for Texas A&M for this dimension.<sup>7 8</sup>

- Alternatively, g.) An experienced Program Officer could interpret all of the rhetoric about Broader Impact and new scoring rules as mere political posturing, blowing smoke at Congress and interest groups whose votes are being sought for the NSF budget. When sophisticated Program Officers are not told what weights and scoring calibrations to use, nor required to keep complete and auditable records of the algorithm, scores, and weights, nor asked to achieve consistency, they may infer a message that they are expected to keep faith with research scientists. I.e., to continue giving Scientific Merit awards with, at best, only a light sprinkling of pixie dust to shift the final list, at the margin, if there is a highly visible case or possible complaint. NSF Directors may be perceived by career Program Officers to operate a political, "Don't Ask, Don't Tell" regime that is designed to get money.

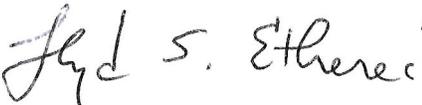
**3.) Incomplete and Misleading Disclosures.** This previous section (2.) illustrates why the NSF's changed system, as revised in December 2014, will not meet legal tests for transparency, good faith disclosure, and accountability. Specifically: the Press Release discloses that the NSF Director has added the evasive maneuver and option to ask Principal Investigators to participate in writing NSF's new published justifications for their awards (i.e., which, apparently, will be broad-brush and only verbal). You may not do this. NSF's actual internal decision algorithms (as illustrated above) include definitions, rules, objective and discretionary — and potentially controversial - scoring, and weights that, as a general rule, will be unknown to individual Principal Investigators. NSF is a government agency: it may not out-source its explanations to 49,000 applicants of how its new system for national competition has decided winners and losers.

## NSF's Abuse of Power and Unwritten Rules.

I have brought other civic and legal issues, concerning NSF's abuses of its discretionary authority and violations of the international Statement of Principles of Scientific Merit Review, to your attention earlier. Notably NSF also has unwritten rules to avoid criticism and high-minded program goals that are defined, secretly and *ad hoc*, to restrict academic freedom and the civic role of universities and effect prior censorship by imagining future controversy that might occur. For example - its acknowledged formal legal requirement to promote economic well-being notwithstanding - NSF has, for 30+ years, neutralized testing of key Republican claims about economic behavior. These and other missing variables have been recognized to undermine the scientific integrity, reliability, and interpretation of NSF-funded research and to be a failure to apply the best available scientific methods. The NSF system -including the current NSF Director and her "senior management teams" - also has over-ridden Scientific Merit and national economic well-being criteria recommended by its own expert (Committee of Visitors) advisers and terminated progress in economic science, at a time when the lives of billions of people are being damaged by unreliable scientific theories. Trustworthy stewardship and a defining commitment to scientific progress and reliable scientific theory was, once, the primary goal of NSF's design (by Vannevar Bush *et al.*) and the foundation of its moral legitimacy.

I note that AAAS's CEO and our President-elect both are current members of the National Science Board. I hope that they can be of assistance to secure, for the AAAS Council's meeting, the consistency metrics and true full disclosure of decision algorithms and Program Officer variability, by which the Council can, applying the null hypothesis after several years, judge whether scientists have a basis for confidence in NSF's Director and the new NSF system. The National Science Board also may, with a wider range of independent legal opinion, wish to make the same judgment.

Yours truly, (



Dr. Lloyd S. Etheredge, Project Director

### Attachments:

- National Science Foundation, National Science Foundation Updates Transparency and Accountability Practices. Press release 14-163, December 3, 2014.
- National Science Board, National Science Foundation's Merit Review Criteria: Review and Revisions (2011), pp. 9, 34-35.

### Endnotes

<sup>1</sup> "National Science Foundation Updates Transparency and Accountability Practices," Press Release 14-163. December 3, 2014. Online at

[http://www.nsf.gov/news/news\\_summ.jsp?cntn\\_id=133533&org=NSF&from=news](http://www.nsf.gov/news/news_summ.jsp?cntn_id=133533&org=NSF&from=news).

<sup>2</sup> Reliable competitive evaluations (e.g., of economic impact) are challenging even for experts using the best available scientific methods.

<sup>3</sup> National Science Board, National Science Foundation's Merit Review Criteria: Review and Revisions. NSB/MR-11-22, December 14, 2011 (Washington, DC: National Science Foundation, 2011), pp. online at <http://www.nsf.gov/nsb/publications/2011/meritreviewcriteria.pdf>

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<sup>4</sup> National Science Foundation, NSF Grant Proposal Guide, NSF 15-1, December 26, 2014. Chapter III - NSF Proposal Processing and Review, online at [http://www.nsf.gov/pubs/policydocs/pappguide/nsfl5001/gpg\\_3.jsp](http://www.nsf.gov/pubs/policydocs/pappguide/nsfl5001/gpg_3.jsp).

<sup>5</sup> Dr. Cora Marrett, "The Merit Review Process: Ensuring Limited Federal Resources are Invested in the Best Science," section on Developing Funding Recommendations. Testimony to the House Committee on Science, Space, and Technology; Subcommittee on Research and Science Education. July 26, 2011. Online without page numbers:

[http://www.nsf.gov/about/congress/112/cm\\_meritreview\\_110726.jsp](http://www.nsf.gov/about/congress/112/cm_meritreview_110726.jsp)

<sup>6</sup> National Science Board, Investing in the Future: NSF Cost Sharing Policies for a Robust Federal Research Enterprise, August 3, 2009. NSB-09-20. Online at <http://www.nsf.gov/pubs/2009/nsb0920/nsb0920.pdf>, *passim*. Also, any information about an institution's willingness to share costs should be pre-censored and removed from applications and "NSF should prohibit voluntary committed cost sharing in all components of both solicited and unsolicited proposals" Recommendation 6. This earlier National Science Board dominated by non-elite, development-oriented universities passed the guidance that "equal competitiveness" should be part of NSF's new, politicized decision system: "Although no quantitative analysis is available, the Board suggests . . . that voluntary committed cost sharing can foster unequal competitiveness among grantee institutions based on their ability and willingness to contribute cost sharing resources to NSF-sponsored projects." p. 11.

<sup>7</sup> "If the size of the activity is limited [sic], evaluation of that activity in isolation is not likely to be meaningful. Thus, assessing the effectiveness of these activities may best be done at a higher, more aggregated, level than the individual project." NSF Grant Proposal Guide, NSF 15-1, December 26, 2014. Chapter III - NSF Proposal Processing and Review.

[http://www.nsf.gov/pubs/policydocs/pappguide/nsfl5001/gpg\\_3.jsp](http://www.nsf.gov/pubs/policydocs/pappguide/nsfl5001/gpg_3.jsp).

<sup>8</sup> The December 2014 Press Release and NSF's public relations plan to justify its awards by reference to high-minded, distant goals is somewhat puzzling. Program Officer ratings of most projects' long-term contributions to economic well-being, national security, etc. appear to be prohibited.



**National Science Foundation's  
Merit Review Criteria:  
*Review and Revisions***

December 14, 2011

- Many believed that the broader impacts criterion has changed how people think about the scientific process, but that assessing the effectiveness of broader impacts would be more meaningful if they were aggregated at a higher level than the individual project.
- With respect to assessment of outcomes, there was agreement that current methods for assessing intellectual merit are adequate (publications, etc.). On the other hand, the data suggested that the methods for assessing the outcomes from broader impacts are unclear and inconsistent across projects and institutions. There was a strong sense that NSF should be doing more to facilitate assessment of whether or not the goals of the Broader Impacts criterion are being realized.
- A large majority of stakeholders believed that institutions could do more to support the PIs' efforts related to meeting the Broader Impacts criterion. For example, institutions could facilitate the establishment of connections -- among PIs engaged in similar activities, or between PIs and established programs or organizations with similar interests, etc., -- coordinate assessment activities, or provide other types of supporting services that could enhance the PI's efforts.

- The Broader Impacts criterion calls researchers' attention to the role of their work in society.
- The Broader Impacts [criterion] is wonderful in that it asks the question about what's the context in which the Intellectual Merit takes place, how do we strengthen the value of research?

*The Broader Impacts criterion and/or expectations are not clear.*

In nine interviews, leaders expressed the concern that the Broader Impacts criterion is vague, and that proposers and reviewers struggle to find a common understanding or evaluation metric. Leaders' statements included:

- The Broader Impacts criterion is interpreted very differently by the different communities. There is a higher bar in some communities than in others. If your research will affect other sciences, that's a broader impact in some communities. Often panelists don't pick up on the fact that this is a new principal investigator or a member of an underrepresented minority. Panelists don't understand that *that* is a part of Broader Impacts.
- The weakness of the Broader Impacts criterion is that it is mysterious to people; it is not understood by principal investigators, perspective principal investigators, or panelists.
- The criteria for deciding what is a good broader impact were never well defined – everyone has struggled with it. It is like a big fuzzy ball.
- [The vagueness of the Broader Impacts criterion] causes confusion because the community thinks that specific things need to be described for the criterion; reviewers and some program officers also think that.
- There is a general misconception it has only to do with education or of getting more women/minorities into STEM (Science, Technology, Engineering, and Mathematics) fields.
- Broader Impacts are seen as a “moving target” – there is frustration among principal investigators that they have to develop a Broader Impacts plan and they don't know how best to do that.

In three interviews where leaders raised concerns about the clarity of the Broader Impacts criterion guidance, leaders suggested that the lack of clarity can result in proposers viewing the potential considerations for the Broader Impacts criterion as a checklist. Their statements included:

- People get confused in that the areas for Broader Impacts are like a shopping list. Principal investigators wonder if they have to address all [potential considerations] on the list or just one or just some. Young faculty especially sees it as a checklist.
- If you look at the bullets [potential considerations] under the criteria, you see that they cover a wide range of topics. What happens is that principal investigators and sometimes program officers don't really know whether or not it is important to address all the bullets.
- There are many different ways to get broader impacts. There is some feeling in parts of the community that different pieces of Broader Impacts are more important than others, that you are supposed to deal with all of it, and if you don't deal with all considerations at a higher level, you're not doing the job.

*There are ways the Broader Impacts criterion could be clarified.*

In five interviews, officials made some suggestions for improving the Broader Impacts criterion, most related to clarifications and instructions, such as:

- Add “consistent with the scope of your project.”
- Add examples specific to a program.

- Add "improve international collaboration".
- Carefully articulate what NSF means by "Broader Impacts", and perhaps state some flexibility as to how much some awardees are expected to respond vs. other awardees.
- Give the Broader Impacts criterion a better umbrella definition so that people understand that the potential considerations are just examples.

### / *Weighting of Intellectual Merit Criterion and Broader Impacts Criterion*

#### *Reviewers have difficulty evaluating and/or weighting Broader Impacts criterion potential considerations.*

In four interviews, NSF Leaders indicated that while reviewers are typically well qualified to evaluate the Intellectual Merit criterion, they are not consistently able to effectively evaluate the Broader Impacts criterion. The leaders suggested that reviewers have a very hard time comparing different types of Broader Impacts, saying things such as:

- Reviewers are frustrated that they don't have the expertise to compare working with a high school class vs. developing a museum exhibit vs. working with an HBCU [Historical Black Colleges and Universities]. They can only look at whether it seems reasonable.
- It is hard for reviewers to give the Broader impacts criterion a clearly objective set of evaluative criteria - how do you compare a proposal that includes graduate students with one that includes a partnership with a museum?

#### *Reviewers and principal investigators place more weight on the Intellectual Merit criterion than on the Broader Impacts criterion.*

Also in four of the interviews, leaders mentioned that they see reviewers and proposers weight the Intellectual Merit criterion more heavily than the Broader Impacts criterion, making statements such as:

- Broader Impacts statements are sometimes seen as a "tie-breaker" or as a way to pick one proposal over the other.
- Leaders hear: "If we are going to fund something it has to have intellectual merit; then we look at the broader impacts."
- People have problems weighting the two criteria. They have heard that the weighting is often 80/20, Intellectual Merit to Broader Impacts. There is no rule about this but Intellectual Merit is the driving force for most reviewers -where this is a strength or a weakness depends on the proposal.
- The default with many proposals is that they describe research and then add a little paragraph that has to do with their graduate students, or they will talk a bit about what they plan to do with respect to outreach. The main issue has to do with the lack of understanding by the people who write proposals, the reviewers, and also the staff at NSF. There is not a very sophisticated understanding of what a broader impact can be. You get a cookie cutter approach - principal investigators just throw a piece in.

Press Release **14-163**. December 3, 2014. [Online at [http://www.nsf.gov/news/newssumm.jsp?cntn\\_id=133533&org=NSF&from=news](http://www.nsf.gov/news/newssumm.jsp?cntn_id=133533&org=NSF&from=news)]

## **National Science Foundation updates transparency and accountability practices**

At the November National Science Board (NSB) meeting, National Science Foundation (NSF) Director France A. Cordova outlined the agency's new approaches to enhancing transparency and accountability, including a revision **to** the agency's guidelines for program officers and providing regular updates on the agency's transparency and accountability web page.

"Good stewardship of public resources requires ongoing examination of our processes and continuous improvement," **Cordova** said. "We will continue to convey the significance of our science and engineering research in supporting the national interest. To do this we must clearly communicate our funding rationale publicly."

The guidelines for program officers in the Proposal and Award Manual now state that a nontechnical project description must explain **the** project's significance and importance and "serve as a public justification for NSF funding by articulating how the project serves the national interest, as stated by NSF's mission: to promote the progress of science; to advance the national health, prosperity and welfare; or to secure the national defense." The titles and abstracts of NSF's awards are made public on NSF.gov.

"NSF is committed to communicating to the American public how grants awarded for fundamental research are selected through external review based on their merit and their promise to fulfill NSF's mission," said NSB Chair Dan Arvizu. "It is important to clearly explain through award titles and abstracts how the research in which NSF invests results in new discoveries and innovations, enhanced prosperity, and the preparation of the next generation of scientists and engineers."

NSF also has provided to program staff new guidelines and training for writing award abstracts and titles. The agency, **Cordova** said, also has taken steps to reinforce roles and responsibilities of division directors and program officers related to the merit review process.

On Dec. 26, 2014, NSF's Proposal and Award Policies and Procedures Guide for principal investigators (Pis) will be updated to include the following statement: "Should a proposal be recommended for award, the PI may be contacted by the NSF Program Officer for assistance in preparation of the public award abstract and its title. An NSF award abstract, with its title, is an NSF document that describes the project and justifies the expenditure of Federal funds."

# STATEMENT OF PRINCIPLES FOR SCIENTIFIC MERIT REVIEW\*



## Preamble

Research funding agencies worldwide identify and support scientific research that creates new knowledge and benefits society. Trusted with government funding, these agencies are publicly accountable for their funded research efforts. As stewards of the public trust, these institutions must demonstrate excellence in the assessment of proposed research and be responsive to program objectives. Rigorous and transparent scientific merit review helps to assure that government funding is appropriately expended on the most worthy projects to advance the progress of science and address societal challenges.

The rapid growth of research and education capacity worldwide is enabling unprecedented opportunities for global collaboration to expand scientific knowledge and to improve the quality of life and well-being of citizens. To foster collaborations and to realize the benefits of international cooperation, the following Principles for Scientific Merit Review are endorsed at the May 2012 Global Summit on Scientific Merit Review.

## Principles

### Expert Assessment

Collectively, reviewers should have the appropriate knowledge and expertise to assess the proposal both at the level of the broad context of the research field(s) to which it contributes and with respect to the specific objectives and methodology. Reviewers should be selected according to clear criteria.

### Transparency

Decisions must be based on clearly described rules, procedures and evaluation criteria that are published *a priori*. Applicants should receive appropriate feedback on the evaluation of their proposal.

### Impartiality

Proposals must be assessed fairly and on their merit. Conflicts of interest must be declared and managed according to defined, published processes.

### Appropriateness

The review process should be consistent with the nature of the call, with the research area addressed, and in proportion to the investment and complexity of the work.

### Confidentiality

All proposals, including related data, intellectual property and other documents, must be treated in confidence by reviewers and organizations involved in the review process.

### Integrity and Ethical Considerations

Ethics and integrity are paramount to the review process.

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\* The terms Merit Review and Peer Review are used interchangeably in the context of this document.

November 19, 2015

To: Interested Colleagues

From: Lloyd Etheredge <sup>1</sup>

Re: **The Optimistic Case for Rapid Learning Economics**

This memorandum outlines, from three perspectives, an optimistic scientific case that a rapid learning system for macroeconomics is possible. Such an achievement, by using the best scientific methods, is likely to provide a better future for billions of people. The three perspectives are: 1.) The existence of “upgrade” variables, widely acknowledged by the profession; 2.) The existence of competing theories that will produce scientific learning about important challenges as new data systems allow them to be tested; 3.) The existence of improved scientific methods for data analysis and fast machine-assisted learning, developed by NIH and the biomedical sciences, that can yield rapid discoveries for US and other G-20 economies.

### **I. Missing “upgrade” variables acknowledged by professionals**

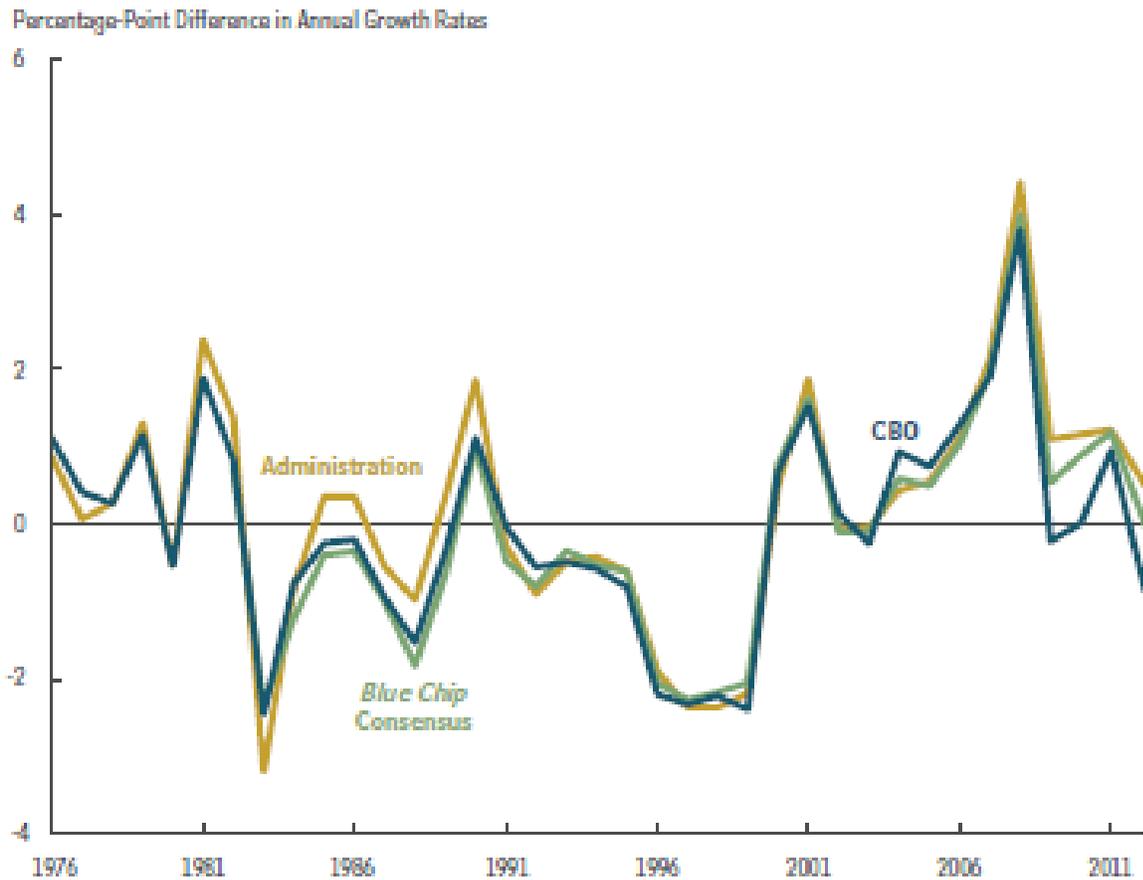
The following graph compares the two-year GDP forecasting errors of the Congressional Budget Office, Administration, and about 50 private sector “Blue Chip” models since 1976.<sup>2</sup> They closely track one another. This is a highly competitive business. Almost everybody uses the same government data, traditional

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<sup>1</sup> Director, Government Learning Project, Policy Sciences Center, Inc., a public foundation. URL: [www.policyscience.net](http://www.policyscience.net); [lloyd.etheredge@policyscience.net](mailto:lloyd.etheredge@policyscience.net); 301-365-5241.

<sup>2</sup> Congressional Budget Office, CBO’s Economic Forecasting Record: 2015 Update (Washington, DC: Congressional Budget Office, February 2015). Online. Comparing Federal Reserve two-year forecasts produces similar results.

Table 1



Forecast Minus Actual Growth in Inflation-Adjusted Output: Two-Year Forecasts

Source: Congressional Budget Office, CBO's Economic Forecasting Record, 2015 Update, (Washington, DC: Congressional Budget Office, February 2015), p. 16. The Blue Chip Consensus is based on about 50 private forecasting models.

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conceptual frameworks, and linear regression analysis of quarterly time series data. We should not wait for further progress from the current data system.<sup>3</sup>

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<sup>3</sup> The average (root mean square) forecasting error of 1.8, compared to an actual growth rate that might be 3.0, is large for scientific models in most fields, perhaps another reason to be optimistic.

There is professional agreement that there are several types of missing variables:

1.) The “mystery” variables that cause recessions/collapses and recoveries are missing: as CBO reports, forecasting equations miss "turning points";<sup>4</sup>

2.) By design, the predictable nonrational psychological mechanisms and societal forces (discovered by the other social sciences) that might affect economic behavior are missing. [Macroeconomic forecasting uses aggregate variables defined by accountants and the tax code; the coefficients are (without independent verification) *interpreted* as rational choices, although they might be compounds of several individual cognitive processes and emotions or organizational or cultural characteristics;

3.) New structural or systemic changes in the world – e.g., information age technologies and technologies (plus other factors) that change oil prices, sociological/cultural changes, and a globalizing economy - are missing. The analysis of standard quarterly time series data, with coefficients averaged across history, slows learning, limits reliability, and this also (as we will see below, in Larry Summers’s argument) might be dangerous.

Other recognized limitations and upgrade opportunities might be discussed. However, for current purposes, this inventory makes the point: The message is

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<sup>4</sup> *Op cit.*, pp. 7-11.

optimistic. Although nobody can know the results of new scientific research in advance, there already is broad professional agreement about several types of plausible variables for a To Do list and scientific upgrade.

## **II. Competing Theories and Policy Disagreements to Establish Initial Priorities**

The second perspective that gives optimism for rapid learning is that there already are well-structured disagreements, with policy relevant implications, that can be tested quickly to improve economic science in the US and other G-20 nations. For example, here are five controversies:

### **A. “The Global Economy is in Serious Danger.”**

The attached Op Ed piece (last month) by former Harvard President and former Treasury Secretary Larry Summers, “The Global Economy is in Serious Danger,” argues that there have been fundamental global changes.<sup>5</sup> The coefficients have changed and there are new variables. Thus, it is dangerous to use conventional economic models and rely upon current economic science. The global economic recovery (that already has taken twice as long as estimated by conventional equations) will take much longer and the future could be surprisingly worse than we expect. [This argument requires that missing variables be identified, coefficients re-estimated, and deeper causes of changed coefficients (if they are found) be understood – and much sooner than the analysis of historical time series can achieve].

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<sup>5</sup> Larry Summers, “The Global Economy is in Serious Danger,” Washington Post, October 7, 2015.

**B.) Economic science doesn't need further learning. Governments only need to listen to economists.**

The attached Op Ed piece (earlier this month) by Nobelist Paul Krugman, “Austerity’s Grim Legacy,” argues that there are no missing variables of consequence.<sup>6</sup> Economic recovery has been delayed, in the US and abroad, simply because governments stopped listening to the equations and sound policy advice.

This is a challenging counter-factual argument. A task for Krugman’s thesis is to explain apparently unreliable equations that scared people. G-20 governments listened when the crisis began but, after initial success, the fiscal stimulus policies also faltered in their prediction of recovery. Economic forecasters had no reliable estimates of how much time and money would be required to achieve the turning point. If we should renew the large fiscal stimulus solutions, can there be rapid learning to address the risk of new failure + massive national debts without achieving healthy growth?

**C.) Linear equation models are giving the wrong result.**

“How reliable are these tools? They work, but they don’t work great. People and institutions find ways around them.” - Olivier Blanchard<sup>7</sup>

The International Monetary Fund’s former Chief Economist, Olivier Blanchard, implies that global economic science can become more realistic by upgrading from physics-like linear regression forecasting models to game-theoretic models.

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<sup>6</sup> The New York Times, November 6, 2015. Online.

<sup>7</sup> Cited in Lloyd S. Etheredge, “A Rapid Learning System for G-20 Macroeconomics: From Greenspan to Shiller and Big Data.” Unpublished, online at [www.policyscience.net](http://www.policyscience.net) at I. A., p. 29.

Today, smarter people, with growing asymmetries of brainpower and funds for lobbying, can outsmart many national governments. The force of his argument is backed by IMF data (not widely known to the public) that the world, from the late 1970s to 2003, had 117 banking crises in 93 countries in which much or all of the banking capital was exhausted. Many financial institutions developed strategies for privatizing the gains (during the upside of the bubbles) then secured government bailouts during the crisis phase. In 27 of the cases, they dumped onto governments and taxpayers added national debt equal to 10% of GDP, often much more.<sup>8</sup> This is not Tulipmania anymore. The problems are not “irrational exuberance” of mass investors but brilliant strategies by alpha predators who can penetrate political systems and shape policy, a phenomenon hidden by missing variables and averaged-coefficient equations.

The better prediction equations of the new domestic and global reality may be the Lotka-Volterra predator-prey equations.

#### **D.) The Ayn Rand novel model of life and the economy has valuable insights.**

Former Federal Reserve Chairman Alan Greenspan has challenged the academic members of his profession to improve their forecasting by including a priority list of psychological and cultural variables.<sup>9</sup> Specifically: although Greenspan has mastered the data and ideas in economic forecasting models he also believes that all of us (and the economy) live inside an Ayn Rand novel, a drama in rela-

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<sup>8</sup> Etheredge, *Op. cit.*, p. 25. Drawn from a discussion by Martin Wolf.

<sup>9</sup> The Map and the Territory (NY: Penguin Press, 2013).

tionship to government and other institutions. The list of variables should recognize basic psychological truths about life, taking responsibility, the work ethic, relations to government (and all authority) and the goal of healthy self-starting, motivated individuals. His views are similar to Governor Romney's psychological diagnosis of 47% of Americans and to the psychological counseling of Reaganomics and Margaret Thatcher, and to the defining economic/psychological truths believed by Paul Ryan, the new Republican Speaker of the House of Representatives. [These views – the “Ayn Rand novel” model – have been acknowledged as a coherent and serious model, held by intellectual leaders of Republicans in Congress, by Paul Krugman (although he thinks that they are dangerous fools).]

It is sometimes alleged that people like Greenspan or Paul Ryan are ideologues who “ignore data.” Although the Krugman’s of the world may eventually prove them wrong, this is partly unfair. Sometimes, their data comes from personal experience and truths that shape their identity. And, while it may have been an historical artifact, econometric modeling evolved from a conventional national accounting system of variables that excluded their ideas from the databases and any Honest Broker estimates from the forecasting models.<sup>10 11</sup>

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<sup>10</sup> Lloyd S. Etheredge, “President Reagan’s Counseling,” Political Psychology (1984), online at [www.policyscience.net](http://www.policyscience.net).

<sup>11</sup> Civic optimism also might be possible. Rapid learning about these Republican-model missing variables, with Honest Broker testing, might shift votes, at the margin, to produce creative legislative compromise and improve agreement in Washington. The simple step of including a consumer “mandate” for individual responsibility to buy health insurance – a provision derived from Governor Romney’s compromise health plan In Massachusetts – preserved an essential element of moral and civic health (in the Republican model) and achieved passage of Obamacare.

### **E.) Breakdowns of Moral Credibility and Trust in Major Institutions**

I also derive optimism because there are new theories (that I have suggested) to explain why policies derived from conventional equations (e.g., low interest rates and fiscal stimulus) misdiagnosed the current breakdowns and do not restore confidence reliably. The current crisis was a sudden and frightening breakdown of trustworthiness and moral credibility by major institutions - governments, political systems, and financial institutions. Confidence in the future cannot be restored by traditional remedies alone because these major institutions have not restored confidence in themselves.<sup>12</sup> If true, science-based learning can help to invent better options.

### **III.) New Rapid Learning Technology**

A third perspective also gives optimism about the possibility of a rapid learning system for economics, which might swiftly benefit economic recovery and the future well-being of billions of people.

Specifically: We have new supercomputer-assisted learning technologies that can be applied to Everything Included databases and produce unexpected discoveries quickly. NIH has shown the new rapid learning systems to be stunningly successful and that they can be routinely applied even to 100,000+ variables/case

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<sup>12</sup> Lloyd Etheredge, "Animal Spirits' and Economic Recovery: Reading the Lessons Correctly," online at [www.policyscience.net](http://www.policyscience.net) at I. A. See also Robert Shiller: "I suspect that there is a real, if still unsubstantiated, link between widespread anxieties and the strange dynamics of the economic world we live in today" in his "Anxiety and Interest Rates: How Uncertainty is Weighing on Us," The New York Times, February 7, 2015. Online.

and tens of millions of cases: for many centuries cancers were classified by the site of occurrence – now we know, from genetic markers, that there might be ten types of cancer that occur in the breast, each with its own causal pathway and possibility of new, precision treatment. The cost of genetic analysis has dropped more than a million-fold.<sup>13</sup> Last week, similar initial discoveries of three types of Type II diabetes were announced.<sup>14</sup> And we are just at the beginning of the new rapid learning system.’

The new NIH computer and Big Data strategy also has invented a faster global discovery system. For example, initial discovery thresholds can be set at 0.70 confidence (rather than 0.95) and the results “published” to computer memory for fast further analysis with new samples and without delays for academic publication. Supercomputing analysis for discovery can operate 24x7 at almost the speed of thought, rather than the speed of an NIH or NSF grant process.

The Nobelist Robert Shiller (although without invoking supercomputers, machine-assisted discovery, and Big Data) has recommended this kind of strategy: an inclusive conceptual and data framework that builds economic theory and reliable economic policy on a foundation of how people actually behave. (I am in Shiller’s

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<sup>13</sup> ‘David Reshef et al, “Detecting Novel Associations in Large Sets of Data,” *Science*, 334, (December 16, 2011), pp. 1518-1524; Vogelstein et al., “Cancer Genome Landscapes,” *Science*, 339, (March 29, 2013), pp. 1546-1558.

<sup>14</sup> Francis Collins, “Big Data Study Reveals Possible Subtypes of Type II Diabetes” NIH Director’s blog, posted online November 10, 2015.

camp)<sup>15</sup> . . . There are no guarantees, but the possibility of rapid learning economics is more optimistic than if these technologies did not exist.

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### Attachments

- Larry Summers, "The Global Economy is in Serious Danger," Washington Post, October 7, 2015.

- Paul Krugman, "Austerity's Grim Legacy," The New York Times, November 6, 2015.

- Lloyd S. Etheredge, "President Reagan's Counseling," Political Psychology, 5:4 (1984), pp. 737-740.

- Francis Collins, "Big Data Study Reveals Possible Subtypes of Type II Diabetes" NIH Director's blog, posted online November 10, 2015.

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<sup>15</sup> Etheredge, "A Rapid Learning System . . ." *op. cit.*; NIH's Everything Included /machine-assisted learning strategy also allows an empirical redefining of all variables and classifications.