

NSF's Responsible Conduct of Research Requirement: Implementation and Best Practices

PRESENTED TO 2019 WE/SO SECTION MEETING, SRA
INTERNATIONAL

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NATIONAL SCIENCE FOUNDATION
OFFICE OF INSPECTOR GENERAL

Outline

NSF OIG

NSF's RCR Policy

NSF OIG review of institutional implementation

- Methodology
- Results
- Fieldwork Observations

Best Practices



NATIONAL SCIENCE FOUNDATION
OFFICE OF INSPECTOR GENERAL

Office of Inspector General (OIG)

Independent oversight office at each federal agency:

- Promotes economy, efficiency, and effectiveness . . .
- Prevents and detects fraud, waste, and abuse . . .
 . . . in agency programs and operations.
- Has full access to records and subpoena power
- Reports to head of agency (e.g., NSB) and Congress



Council of the
INSPECTORS GENERAL
on INTEGRITY and EFFICIENCY



NATIONAL SCIENCE FOUNDATION
OFFICE OF INSPECTOR GENERAL

National Science Foundation OIG (Established 1989)

Office of Investigations

- Research Integrity & Administrative Investigations Division
- Program Integrity (criminal/civil matters)
- Investigative Legal Division (assist/lead on all cases)

Office of Audit

- Compliance Analytics; Financial & IT audits; CPA contract audits oversight; External audits; Performance Audits

Immediate Office

- Legal Counsel, Chief of Staff, professional/administrative staff

Office of Management



NSF OIG Office of Investigations

Research Integrity and Administrative Investigations Division

- Investigate regulatory and policy violations
- Investigate NSF Personnel misconduct
- Delegated responsibility for investigating all RM allegations involving NSF programs
- Unique within the IG Community in that we are the only IG with staff dedicated to addressing RM allegations



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Research Integrity

Plagiarism

Human Subjects

Data Fabrication

Fraud

Inaccurate C&PS

Data Falsification

Inaccurate Reports

Data Management

SBIR activities

NSF's Merit Review

Conflict of Interests

Animal Research

CV Inaccuracies

Failure to reveal affiliations

False Statements

Data Sharing

Biohazards

Mentor Oversight



Why Do We Care About Research Integrity?

Fairness

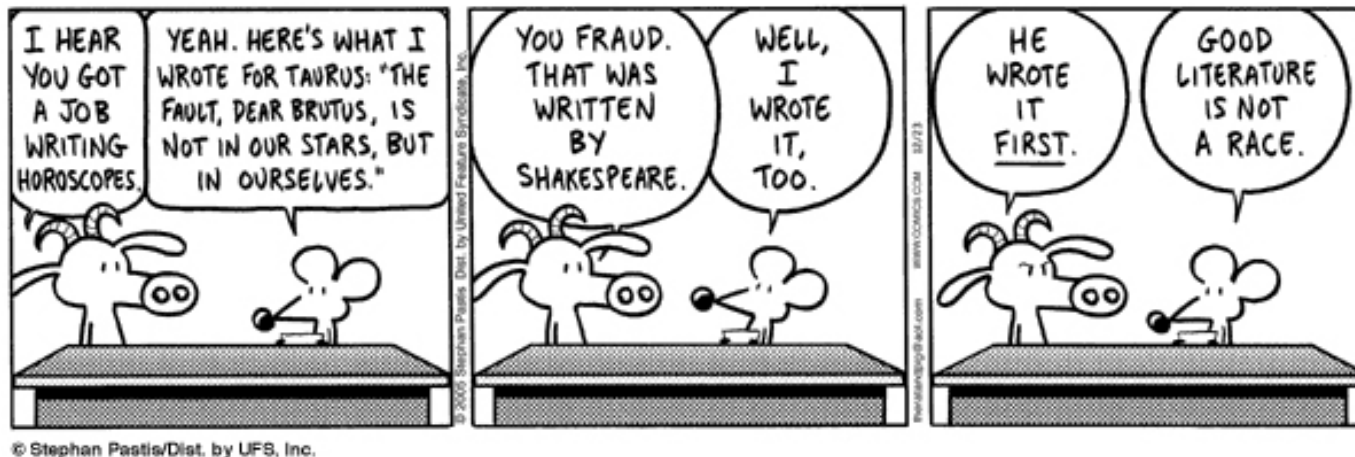
- NSF proposal is a request for taxpayer money
 - RI violations can weaken public trust in funding programs
- False representation of data and plagiarism mislead reviewer assessments of PI capabilities/knowledge/accomplishments

Economy, efficiency, and effectiveness

- Don't want to pay for research already completed
- Don't want subsequent work to be based on misrepresented work



RM Relationship to Fraud



Fraud: a misrepresentation of a material fact to induce another to act to their detriment

- If NSF awards funds based on a proposal containing research integrity violations – the case is analyzed under the criminal and civil fraud statutes and common law fraud doctrine
- Potential for suspension/termination of award and debarment



Semiannual Report to Congress

September 2018 (#59)

Investigations Data

April 1, 2018 – September 30, 2018

Table 6. Investigative Case Activities

Referrals ²⁹ to DOJ Criminal Prosecutors	4
Referrals to Criminal State/Local Authorities	1
Indictments/Criminal Information	2
Arrests	0
Criminal Convictions/Pleas	5
Referrals to DOJ Civil Prosecutors	1
Referrals to Civil State/Local Authorities	0
Civil Settlements/Judgements/Compliance Plans	10
Investigative Reports Issued to NSF Management for Action ³⁰	30
Research Misconduct Findings Issued by NSF	5
Government-wide Suspensions/Debarments/ Voluntary Exclusions	7
Administrative Actions taken by NSF ³¹	31
Total Investigative Recoveries ³²	\$3,950,126 ³³
Substantiated Whistleblower Retaliation	0
Substantiated Agency Interference	0



Case Statistics: Allegations Received

FY	RM Allegations Received (Including allegations made against both funded and declined NSF proposals.)			
	Plagiarism	Fabrication	Falsification	Total ^[1]
2009	108	0	11	119
2010	90	4	10	104
2011	85	17	15	117
2012	94	9	8	111
2013	80	10	12	102
2014	38	7	5	50
2015	67	11	12	90
2016	35	10	11	56
2017	38	1	8	47
2018	38	4	3	45
Totals	673	73	95	841



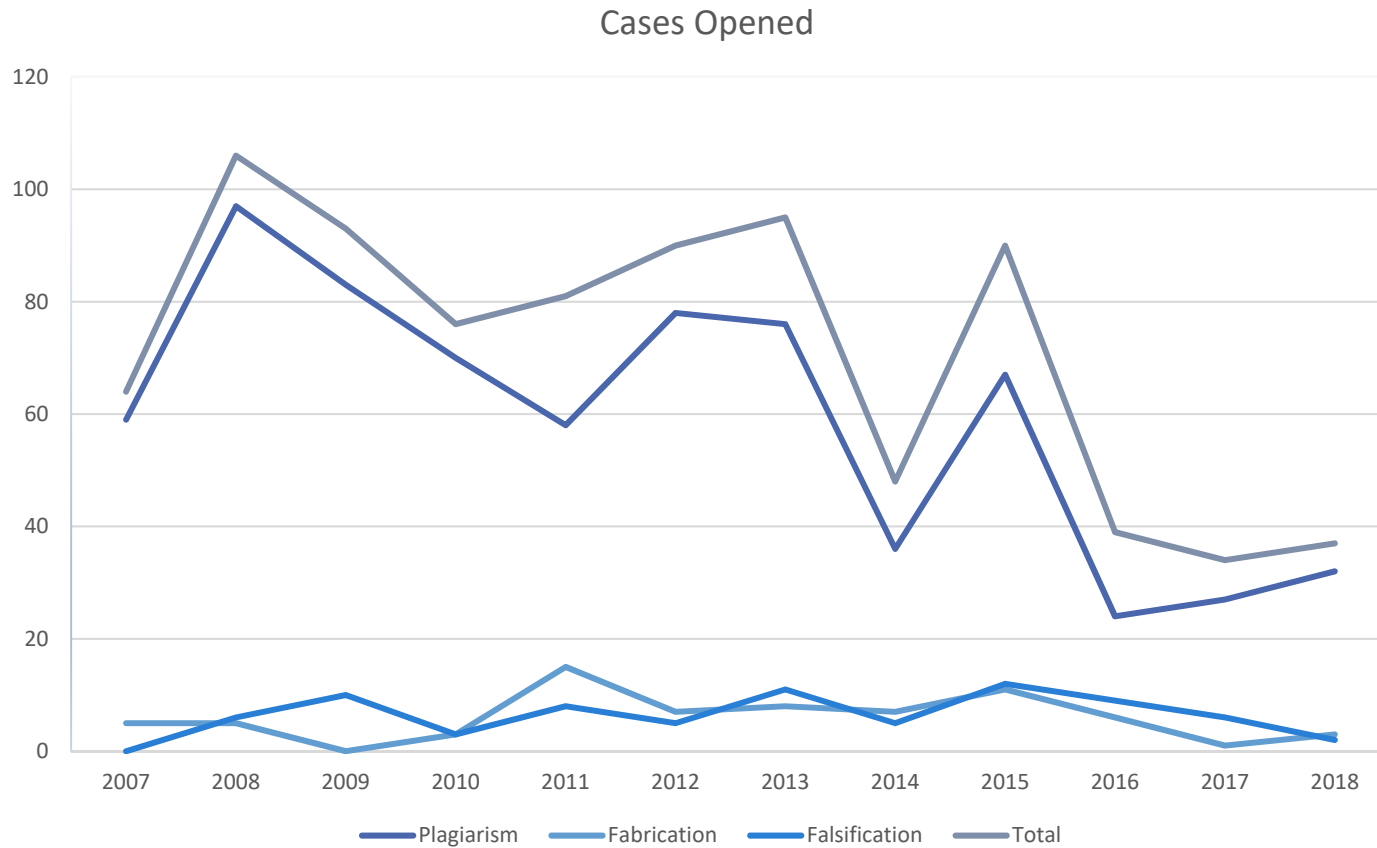
Case Statistics: Cases Opened

FY	RM Allegations Investigated (Including case activity defined as "Inquiry" in the RM regulation.)			
	Plagiarism	Fabrication	Falsification	Total ^[2]
2009	83	0	10	93
2010	70	3	3	76
2011	58	15	8	81
2012	78	7	5	90
2013	76	8	11	95
2014	36	7	5	48
2015	67	11	12	90
2016	24	6	9	39
2017	27	1	6	34
2018	32	3	2	37
Totals	551	61	71	683



Case Statistics

Types of Cases Opened



Case Statistics

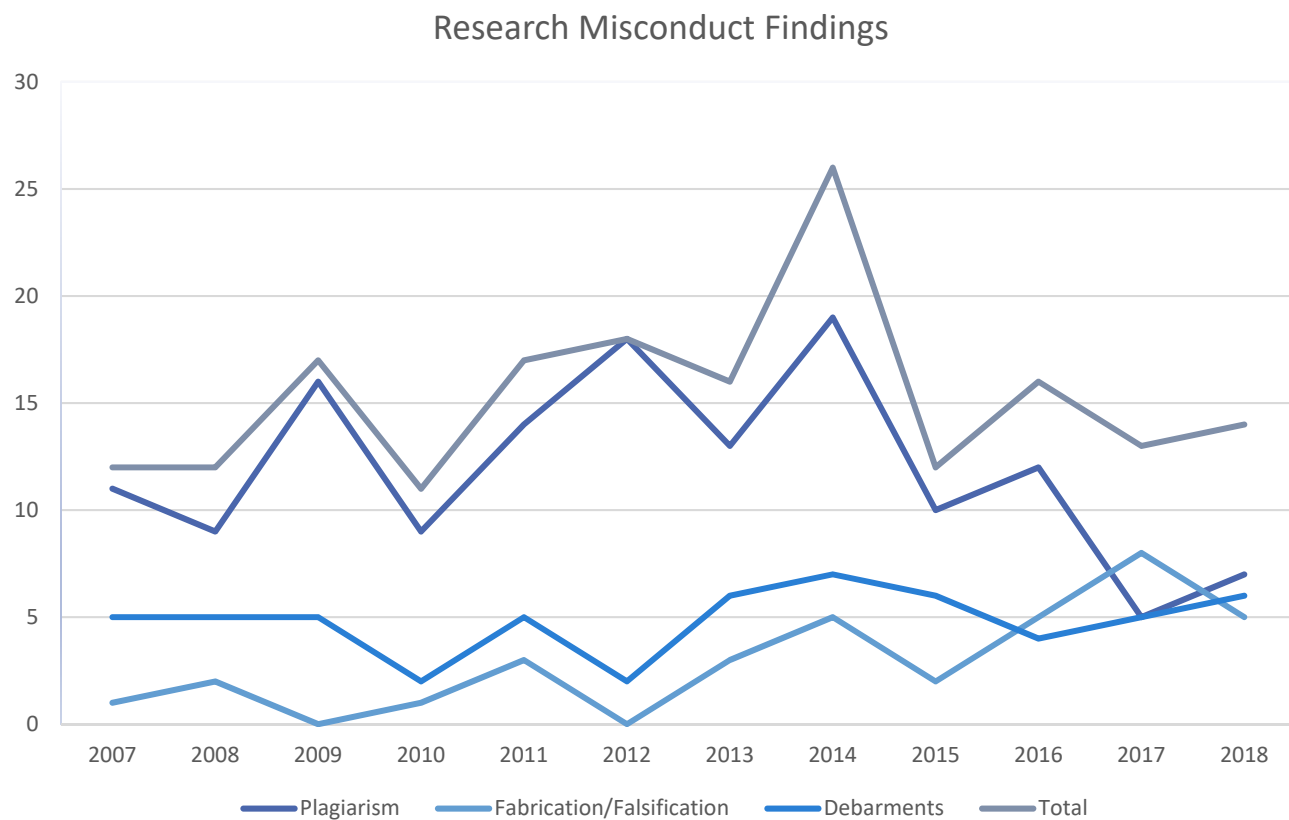
Investigative Outcomes

FY ^[1]	Total RM Findings				Included Debarment ^[2]
	Plagiarism	Fabrication/Falsification	Multi ^[3]	Total	
2009	16	0	1	17	5
2010	9	1	1	11	2
2011	14	3	0	17	5
2012	18	0	0	18	2
2013	13	3	0	16	6
2014	19	5	2	26	7
2015	10	2	0	12	6
2016	12	5	0	16	4
2017	5	8	0	13	5
2018	7	5	2	14	6
Totals	123	32	6	161	48



Case Statistics

Research Misconduct Findings



General Trends

- Number of data fabrication cases (particularly **grad students and post docs**) has increased since 2010
- False statements of contents in the proposals or annual reports
- Stockpiling grants
- Conflicts between faculty and small business time & effort
- Upward trend in violations of NSF's merit review / peer review confidentiality
- Data Management/Sharing
- Disconcerting number of PIs [**no RCR**] who believe copying text is ok if you include a citation to source or if “it is just background material”



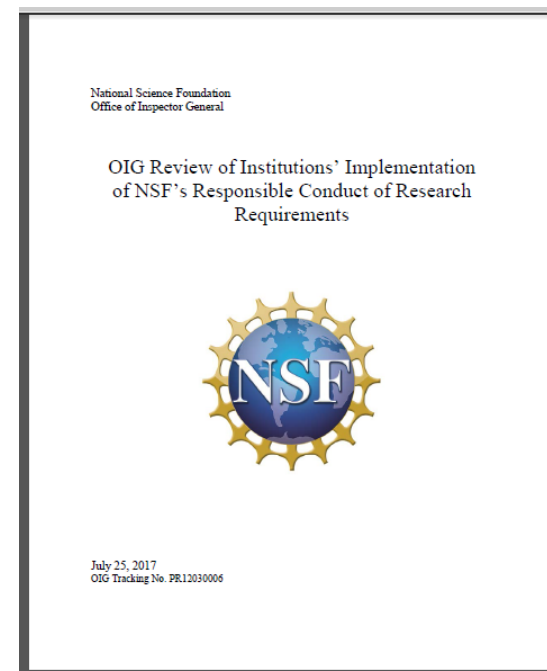
Why the Increase?

- Technology – makes it easier to cheat (and find)
- High profile cases – raises awareness globally
- RCR Training – raise awareness on campus
- Increase in students/faculty from different cultures?
 - 85% of faculty subjects obtain B.S. outside U.S.; 59% M.S.
 - Mentoring/RCR is critical to ensure understanding of ethical expectations
- Hypercompetitive funding environment
 - Doing whatever is necessary to get the competitive edge
- Mentoring – does it still exist?
 - Cycle of success –is there a limit to how many students a PI can effectively mentor?
 - Does your institution provide training to junior faculty on how to be a good mentor?
- Is our culture changing?
 - Studies suggest newer generations have less experience with ethical dilemmas and many can not articulate an ethical dilemma they have faced
 - High levels of self-admitted cheating at the HS and undergrad level



Project Genesis

- RM (plagiarism) investigations
 - Connect allegations to training for post-docs and students (and faculty?) who don't know community standards
 - OIG recommends and NSF requires, *inter alia*, RCR training for subjects who commit RM
- RM and Questionable Practices
 - OIG issues QRP and QAP warnings
 - OIG issued first QRCRP letter to University because one of its faculty claimed not to know community standards. The faculty member was new and from a foreign country.



America COMPETES 2007

RESPONSIBLE CONDUCT OF RESEARCH

NSF's Director shall require each institution to provide **appropriate training** in RCR to **Undergrad, Graduate, or Post-doc (UGP)** researchers **participating** in the proposed research project.

House Report 110-289

The conferees recognize that what constitutes appropriate training may not be the same for U as for G or P.

“The conferees do expect NSF to promptly develop and provide written guidelines and/or templates for universities to follow so that compliance can be verified by all parties.”



NSF RCR Policy Requirements

NSF Proposal and Award Policies and Procedures Guide, Chapter IX.B Responsible Conduct of Research (RCR)

2. Institutional Responsibilities (as of Feb 25, 2019)

- a. An institution must have a plan in place to provide appropriate training and oversight in the responsible and ethical conduct of research to undergraduates, graduate students, and postdoctoral researchers who will be supported by NSF to conduct research. As noted in Chapter II.C.1.d, institutional certification to this effect is required for each proposal.
- b. NSF's RCR requirement applies to the breadth of research disciplines that the Foundation funds. The training provided should be effective and must be appropriately tailored to the specific needs and circumstances at each institution. Accordingly, it is the responsibility of each institution to determine the content, focus and the delivery method for the RCR training.⁵³ While training plans are not required to be included in proposals submitted to NSF, institutions are advised that they are subject to review, upon request.



NSF RCR Policy Requirements

- c. An institution must designate one or more persons to oversee compliance with the RCR training requirement.
- d. Institutions are responsible for verifying that undergraduate students, graduate students, and postdoctoral researchers supported by NSF to conduct research have received training in the responsible and ethical conduct of research.

NSF encourages training of faculty in the responsible and ethical conduct of research.



OIG's Review

- **Compliance**
 - Assess compliance with three requirements
 - Evaluate whether lack of guidance and templates effecting compliance
- **Observations to enable NSF to strengthen implementation:**
 - NSF did not define 'appropriate training'
 - Do universities want guidance?
 - NSF did not provide guidance about RCR course structure or content. NIH did.
 - How do universities meet both requirements?
 - Do universities want NSF guidance about structure and content?

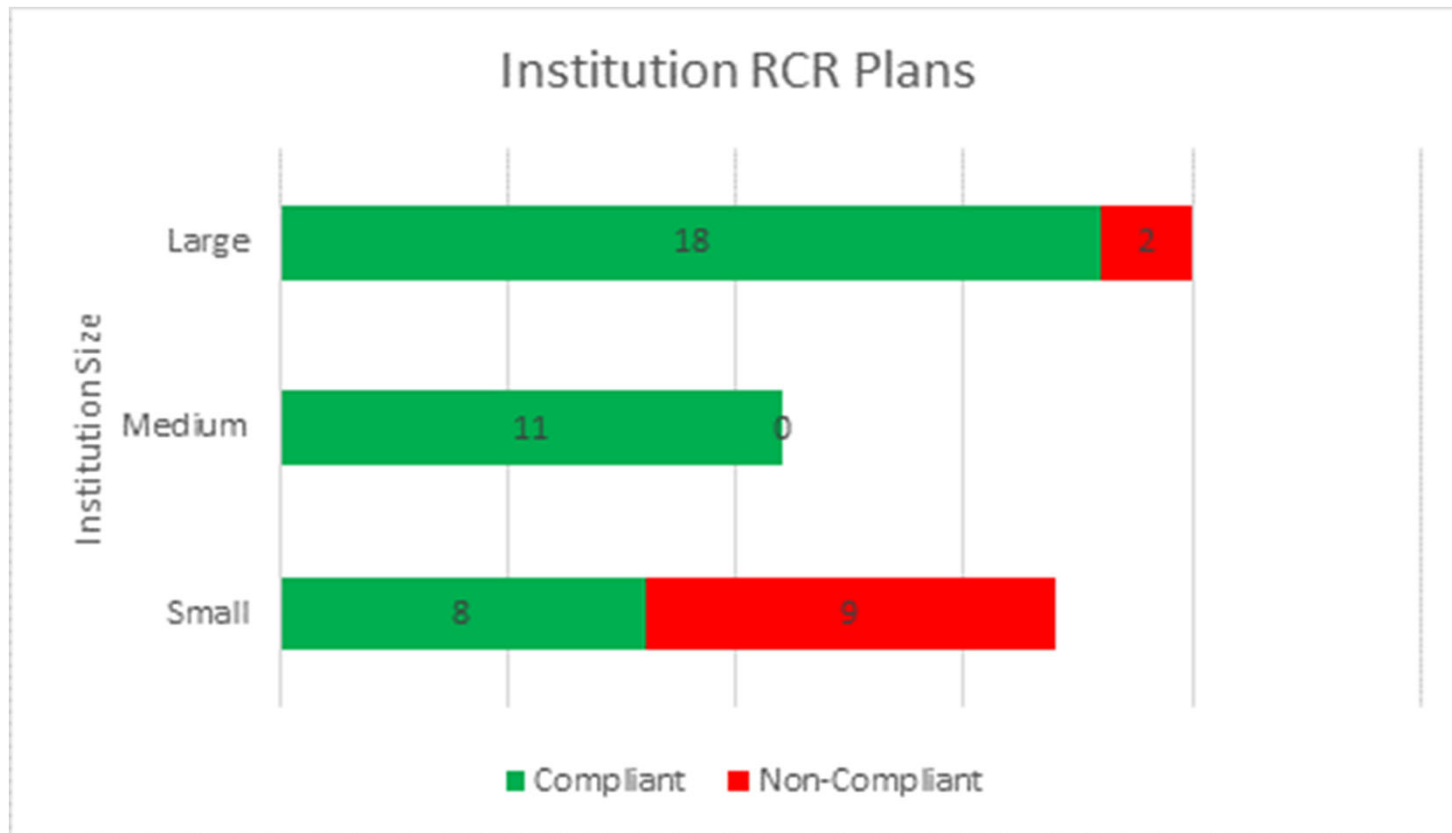


RCR Review Sample/Methodology

- 53 institutions that requested 2013 NSF funding for undergraduates, graduate students, and/or postdocs
 - Small, medium, large
 - Public and private colleges and universities, community colleges
- Review of RCR plans
 - What's the format? What's the subject material? Who participates?
 - Tone from the top? Is plan more aspiration or compliance oriented?
- Interviewed Senior Admin (tone at top), designated RCR Admin, students/post-docs who completed required training



Compliance: RCR Plan



53 initial institutions; ultimately 48 institutions, 11 w/o plans



Compliance: RCR Plan

Our initial sample included 5 Community Colleges (no RCR plans). However, CCs received only “**educational**” grants, so we did not include them: $53 - 5 = 48$.

Thus, **37 out of 48 $\approx$ 77% compliance.**

Most (8 out of 11) non-compliant institutions eventually developed plans; ultimately, **45** institutions had ‘formal’ RCR plans.

45 out of 48 $\approx$ 94% ‘second-chance’ compliance



Compliance: Designated Official

Initially 37 out of 48 $\approx$ 77% compliance

Ultimately, 44 out of 45 $\approx$ 98% compliance

- 1 institution said it only occasionally has NSF grants, and that, when it does, the PI of the award performs the function



Compliance: Tracking

Initially 30 out of the 37 $\approx 81\%$ with RCR plans had sufficient tracking

Ultimately, 37 out of 45 $\approx 82\%$ had sufficient tracking

18% (8 out of 45) of the institutions could not tell if students received training



Differences in Training

Some trained UGP the same (uniform plan), others tailored to level (differentiated plan)

- 52% differentiate based on educational level (typically more online modules for GP; online for U, but in-person for GP)

Most considered discipline

- 72% differentiate based on discipline (typically different online modules; RCR element in curriculum)

A few trained all students, even non-NSF supported

- 73% required only those supported by NSF grant to be trained



Differences in Training

Online training used by most

- 73% allow online-only training to constitute appropriate training
- Officials: cited student convenience, common terms and language, easy way to track completion/compliance
- Students: common-sense advice and/or repetitive advice, not applicable, and/or too basic or generalized; No opportunity to ask questions/discuss content; No case studies

Some offered interactive training as option

- Students did not generally take advantage
- Fun experiment: 65% prefer interactive training—5% choose that (at one university w option)

A few made interactive training mandatory



Characterization of RCR Training

	Required training population is limited to NSF-supported participants	Required trainee population is not limited to NSF-supported participants
Trainee population is able to fulfill the RCR requirement by only taking online training or through document review	64% – Compliance	9% – Hybrid Compliance
Trainee population receives RCR content through required interactive training (i.e., a course, workshop, or seminar)	9% – Hybrid Educational	19% – Educational

- Compliance**: training only those required to be trained; web-based, interaction-free instruction; little faculty involvement
- Education**: training students who are not required to be trained; instructor-led, classroom discussion; more faculty involvement
- Hybrid**



“Appropriate” Training

NSF did not define

Determination left to university

No institution conducted a risk assessment

No basis for determining whether training provided was sufficient to meet RCR training requirement

Examples of approaches

- Generic standard lab safety, or animal/human subjects, or data/IT security training
- RCR training incorporated into curriculum, but can't identify specific RCR topics
- PI determines RCR training w/o guidance from institution
- Read NIH/ORI handout



Best Practices

- Requiring RCR training for *all* grad students (even non-NSF funded)
 - Negative consequences for requiring RCR training only for NSF-funded
- Requiring participants take training *before* beginning NSF research
- Involving faculty in RCR training
 - NSF does not require faculty involvement with/participation in RCR training
 - Only 15% currently do (7 out of 46)
 - All new PIs or those new to NSF funding to take training
 - Requiring those with supported participants to take training
 - 95% of our plagiarism findings are against faculty/PIs, not students
 - Argue they did not commit plagiarism, claim faulty understanding of proper attribution



Best Practices

- Requiring periodic RCR refresher training—Every 3+ years
- Tailoring training for a participant's educational level and/or discipline
- Adding stress management to RCR training
- Augmenting training provided during a semester by providing additional sessions on either side of the required course
- Telling trainees why RCR is important



Conclusions

- Most institutions have RCR plan, designated person, and tracking
- Without definitions or guidance, there are no standards; compliance with adequate training can't be verified
- Institutions want guidance, not regulations
- More 'compliance' than 'education' focused
- Prevalence of online training
- PIs rarely involved



Resources

- OIG Report, Tracking No. PR12030006.
https://www.nsf.gov/oig/pdf/RCR_MIR_Final_7-25-17.pdf
- NSF RCR Policy and Resources:
<https://www.nsf.gov/bfa/dias/policy/rcr.jsp>



Whistleblower Protection

A core value of OIG is the protection of NSF employees, contractors, and grantees who step forward to identify potential wrongdoing.

Federal law prohibits retaliation for providing information reasonably believed to evidence:

- a violation of law, rule, or regulation;
- gross mismanagement;
- a gross waste of funds;
- an abuse of authority; or
- a substantial and specific danger to public health or safety.



Whistleblower Protection

- ***NSF Federal employees*** are protected if they make a whistleblower disclosure to the U.S. Office of Special Counsel, OIG, or a supervisor.
- ***Employees of NSF contractors and grantees (and subcontractors/subgrantees)*** are protected if they make a whistleblower disclosure to their management, an OIG, or an official responsible for investigating misconduct.
- ***All of the above*** are also protected for communications to Congress.
- Info on whistleblower protection is available on our web site and the Office of Special Counsel web site.

<http://www.nsf.gov/oig/whistleblower.jsp>

<http://www.osc.gov>



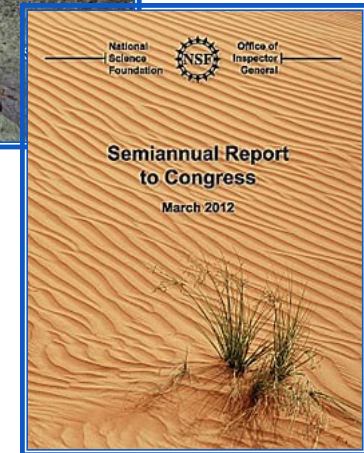
Contacting OIG

- Webpage: www.nsf.gov/oig
- Hotline: 1-800-428-2189
- Phone: 703-292-7100 (business hours) or 703-328-3932
- E-mail: oig@nsf.gov
- Fax: 703-292-9159
- Mail: 2415 Eisenhower Ave, Alexandria, VA 22314
 - ATTN: OIG HOTLINE



Questions?

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