



RCR: Insights from the NSF Office of Inspector General

Council of Graduate Schools

Dec 2017

Jim Kroll

National Science Foundation Office of Inspector General

Overview

- NSF/OIG: Who we are and why we care about research integrity
- America COMPETES and OIG's RCR Review
- The RM numbers and the fraud triangle
- Closing comments

Who is NSF OIG?

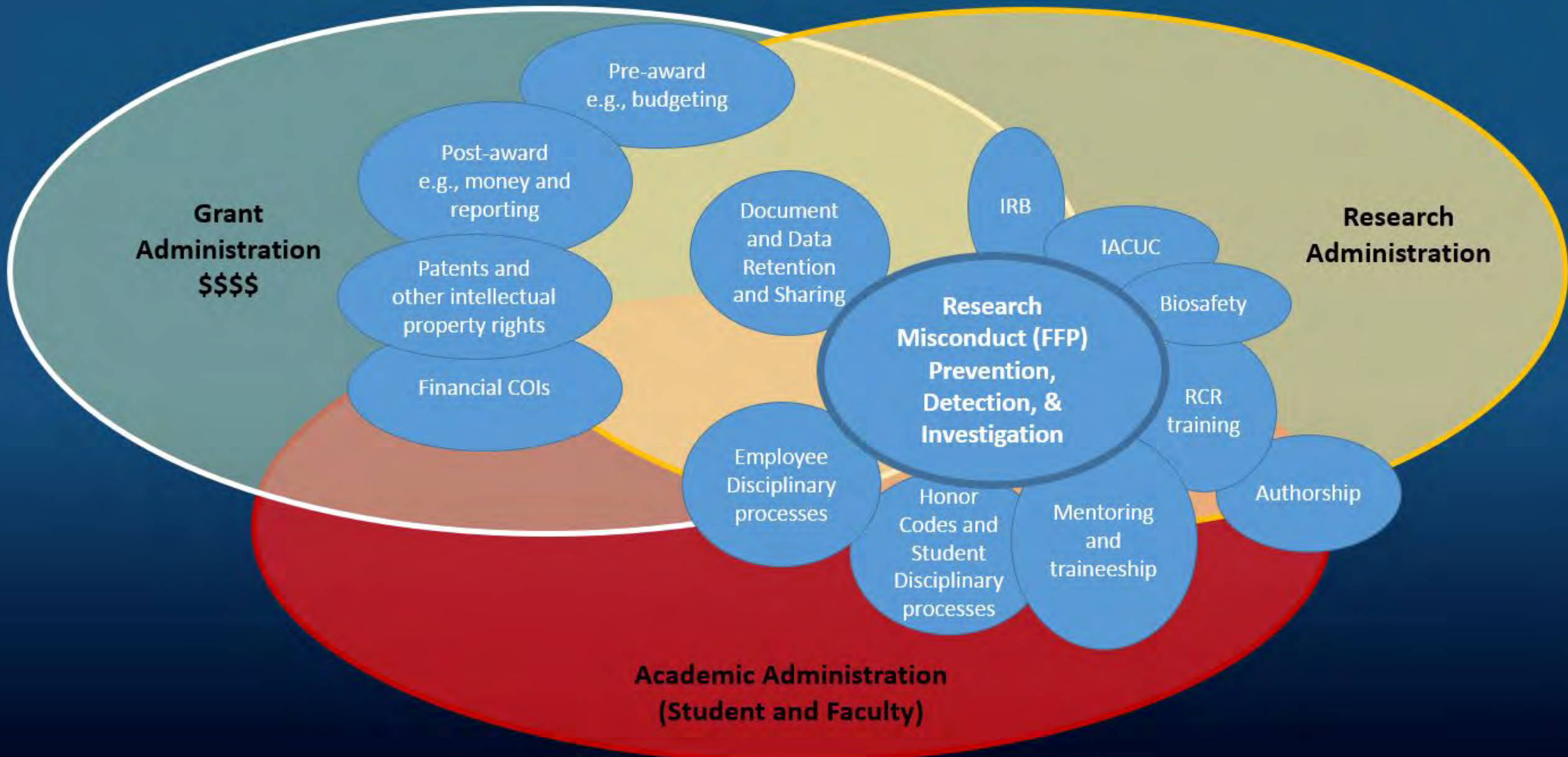
- Independent office reporting to the Congress and NSB
- **Promotes economy, efficiency, and effectiveness**
- **Prevents and detects fraud, waste, and abuse**
- Accomplishes mission through:
 - Audits
 - Investigations
 - Criminal and Civil (*e.g.*, false claims, false statements, embezzlement)
 - Administrative (*e.g.*, regulatory and policy violations)
 - Legal Support Team (serves both criminal and administrative groups)

**Where does Research Integrity (RI)
and the Responsible Conduct of Research (RCR) fit?**

NSF delegated the responsibility for investigating research misconduct at NSF to OIG

- **Unique among the IG Community**

Where does Research Integrity Fit?



Quick Case Examples

- Professor transports research equipment with radioactive materials; poor lab oversight /training results in student injuries
 - PI instructed students to not say anything while transporting the materials
 - Grant suspended and eventually terminated
 - How does your school instruct students on Biosafety? Is there an ombudsman where they can report concerns?
(Biosafety)
- Professor submits falsified IRB approval when notified that he was being awarded a \$1.6M grant; review shows pattern
 - University returns the \$1.6M grant
 - How do you monitor IRB submissions to the funding agency? (IRB)
- Engineering graduate student determines he does not like what he is researching but fears telling his mentors
 - Over three years, he fakes his results; publishes 3 articles and a conference paper; ALL FAKE
 - Thesis/Degree denied; Debarred for 3 years
 - Does your school provide any guidance to PIs about the various roles in mentoring?(RM)

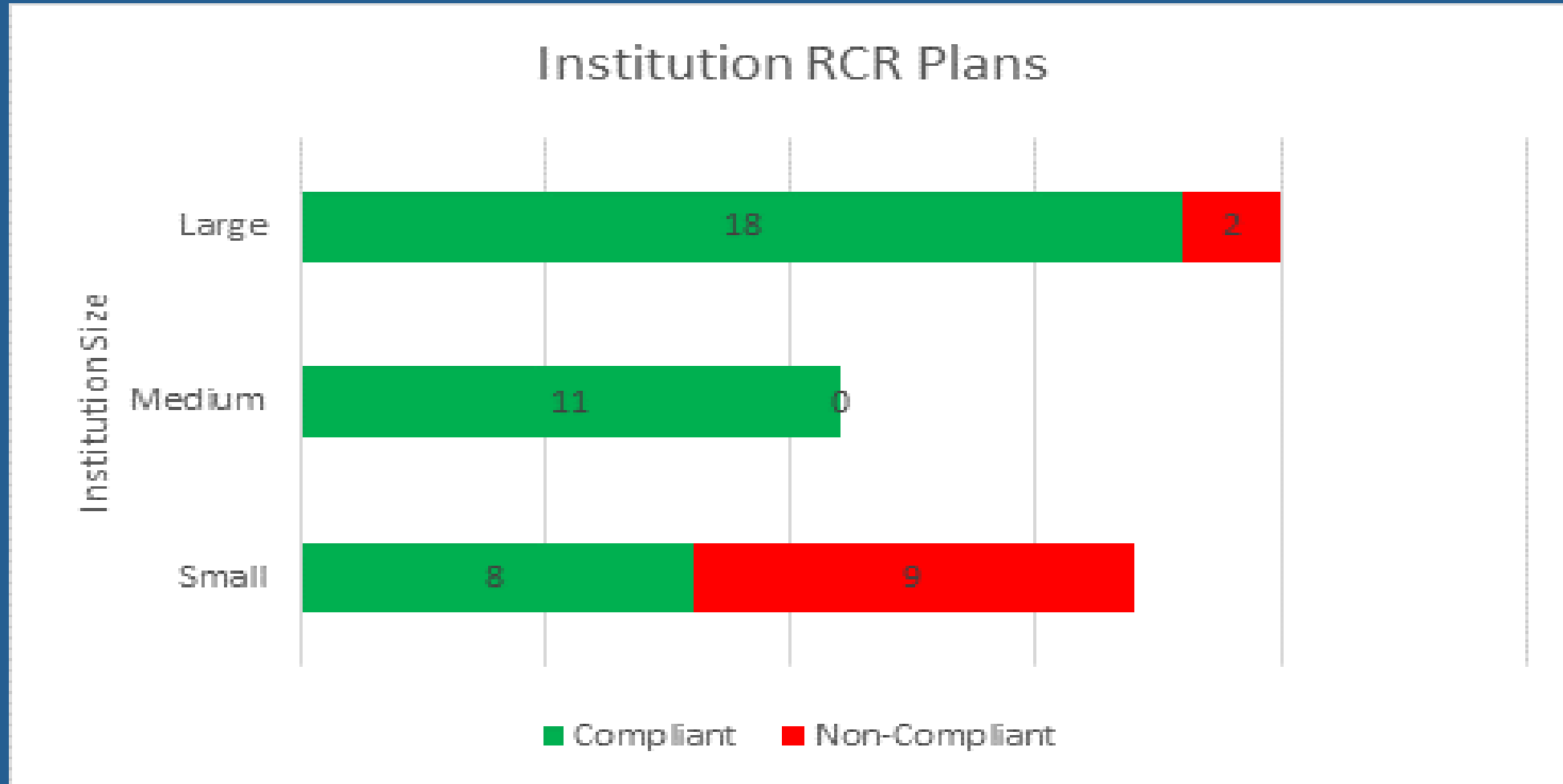
Quick Case Examples

- Graduate student falsifies data results from chemistry studies
 - Working with unstable solutions; results never confirmed hypothesis
 - PI relentless in his pursuit
 - Student responsible for his actions
 - What responsibility, if any, does the PI bear? (RM)
- Mentor and graduate student makes false statements in publication regarding precipitates
 - Fellow researcher explains why the claims are not possible
 - Much discussion in that community
 - University investigates but makes no finding
 - We look at notebooks and find stark contrast
 - Interviewed PI who said he never looks at the notebook data (RM)
- Panelist tweets about the panel in real time
 - NSF asks her to stop Twice
 - Confidential means Confidential
- Reviewer asks students to assist in peer review
 - Might be OK to do but need to ask PO first

Review of NSF's RCR Training Policy

- America COMPETES 2007
 - NSF's Director shall require each institution to provide **appropriate training** in RCR to UGP researchers **participating** in the proposed research project
- NSF's Guidance to Institutions:
 - Have a plan to provide **appropriate** RCR training to UGP researchers who will be **supported** by NSF to conduct **research**
 - Designate someone to oversee compliance
 - Verify that UGP researchers supported by NSF to conduct research have received RCR training — tracking
 - No **guidance/templates**, NSF recommends **risk assessment**
 - Institutional certification is required for each proposal

Institutions That Had RCR Plans When First Contacted by OIG



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

Observations from RCR Review

- Wide variety of training approaches; some differentiated by education level and discipline; some very uniform
 - Brown bag seminars seemed to have popularity where they were offered
- Without definitions, guidance, or standards as to what constitutes “appropriate training,” NSF cannot guarantee that the instruction provided meets a minimum level of quality
- No university used a risk assessment to develop their programs
- Requiring RCR training only for participants supported by NSF can have consequences. People working on one project may be funded from multiple sources
- Although faculty play a critical role in the research enterprise and constitute a significant percentage of research misconduct subjects, only 15 percent of the plans we reviewed require faculty to take RCR training.
- There is no requirement that NSF-funded students and/or researchers take RCR training *before* they begin work on NSF-funded research

Observations from RCR Review

- Most institutions have RCR plan, designated person; 18% did not track students
- Institutions want guidance, not regulations
- Plans reviewed are more focused on 'compliance' than 'education'
- Students comments on online vs interactive training
- NSF received this review very positively! Director letter; opportunity to make change

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>i.e.</i> , a course, workshop, or seminar)	9% – Hybrid Educational	19% – Educational

- 73% required only those supported by NSF grant to be trained
- 73% allow online-only training to constitute appropriate training.

Some Best Practices We Saw/Heard

- Adding stress management to RCR training
- Requiring RCR training for *all* graduate students (even if they are not funded by NSF)
- Involving faculty in RCR training (only 15% currently do)
- Requiring periodic RCR refresher training—every 3+ years
- Requiring participants to take training *before beginning* NSF research

NAS Comments on Research Integrity

- Create and sustain a research culture that fosters integrity and adherence to best practices through effective education/training
- Develop and assess more effective education programs that support integrity in research
- Perform regular assessments of the climate of research integrity at all levels of an institution
- Perform regular inventories of policies and procedures for addressing research misconduct
- Strive for continuous improvement of RCR training and education programs
- Know your responsibilities as a mentor; be an effective mentor to early career researchers
- Manage data effectively and transparently throughout the research process

Fall 2017 Semi Annual

- **Former Assistant Professor Fabricates Data, Misleads Colleagues**
- **Post-Doctoral Fellow Fabricates and Falsifies Data in Four Publications, Three Manuscripts**
- **Graduate Student Falsifies Data and Plagiarizes in Manuscript Published without Co-Authors' Knowledge**
- **Graduate Student Falsified Data in Published Paper**
- **Graduate Student Fabricates Data in Research Supported by a GRFP Grant**
- **Graduate Student Falsifies Experiments – Impacts 14 Figures in Two Papers**
- **Graduate Student Falsified Data in Dissertation**
- **Data Fabrication Leads to \$275,000 of Funds Put To Better Use**

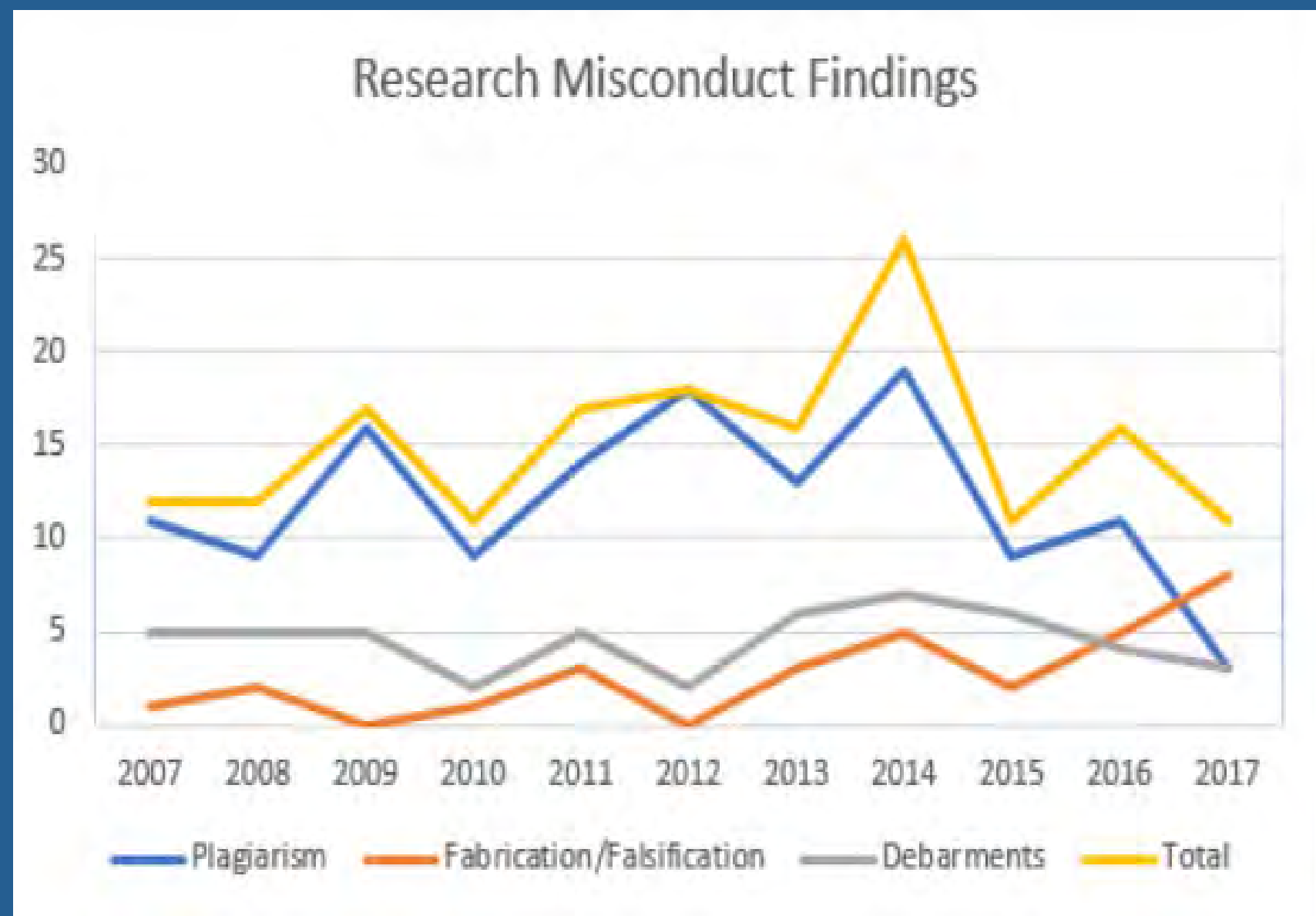
RM Findings

2006-2010

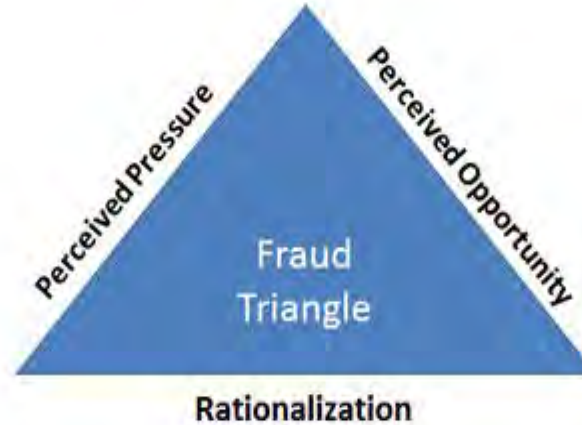
56 Plagiarism
10 Data F/F

2011-2016

84 Plagiarism
19 Data F/F



Fraud Triangle



“We must remember that it is the seemingly unimportant daily decisions that define who we are and that rationalizations weaken our character and cause us to lose our self-respect.” W. Steve Albrecht

- Applies beyond financial fraud to RM, academic dishonesty, and most other aspects of integrity in the academic community
- How do you combat this?
 - Training
 - Mentoring
 - System of checks and balances
 - See something, say something
 - Creating a culture where ethical behavior is expected and supported

Couple of Anecdotal Characteristics of Student/Post-Doc Data F/F Cases

- Mentor disengaged – allegations are first time that data is ever reviewed
 - Result of concerns raised in publication peer review
- Mentor insistent that results don't support hypothesis – do it again!
- Student/Post-Doc just wants to get done – job offer or off to new post-doc position
- Data F/F found as a part of a regular review



What makes now different?

- I would never have thought to risk my reputation or the reputation of my mentor
 - Has the ethical construct of today's younger generation changed since the 1960s-1980s?
 - Trust but Verify
 - Road To Character, David Brooks
- Technology changes
 - Lines can be blurred on what is reasonable/unreasonable image adjustment
- Who makes up today's student population?
- Ultra competitive funding in tough fiscal environment
- Faculty stretched thin and leave students unmentored ??

Some Thoughts on RCR and Mentoring

- RCR training can go a long way to address some of the problems we've talked about
 - Is computer based training the best?
 - Students surveyed suggest that interactive training is preferred
 - Research suggests that hybrid training is more successful
 - In RM cases, we have been recommending interactive training for several years
- RCR may not be just for students
 - 95% of our plagiarism cases from 2010-2015 involved professors – a large percentage of them being junior faculty
 - We also know that a significant number of our RM cases involve researchers who received part or all of their academic training outside the U.S. and may not be well versed in U.S. research standards and ethics
- Good mentorship
 - Numerous student data fabrication cases appear to involve a lack of adequate oversight and mentorship by the PI
 - Do your PIs regularly discuss research ethics with their students?
 - Do your PIs regularly review data collected by their students? (Lack of data can be an issue in student F/F cases)
 - Do you have mentorship training for faculty?
 - Are mentors assigned to new faculty?

Have Talk, Will Travel

Contact Information



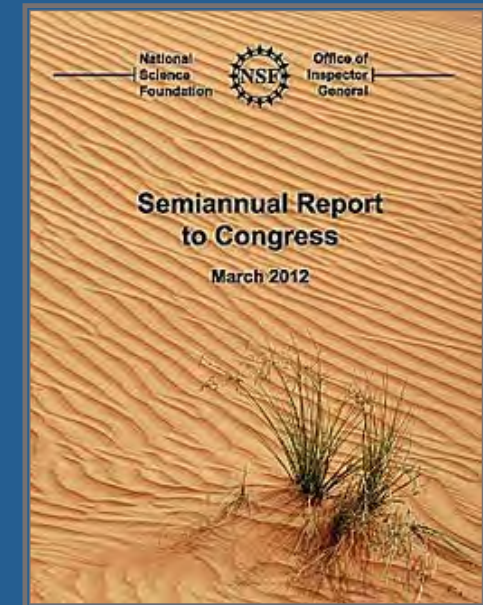
www.nsf.gov/oig

2415 Eisenhower Ave.
Suite W 16100
Alexandria, VA 22314



Hotline:1-800-428-2189
E-mail:oig@nsf.gov
Fax:(703) 292-9158

Jim Kroll
Jkroll@nsf.gov
703-292-5012





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QUESTIONS