NATIONAL SCIENCE FOUNDATION
OFFICE OF INSPECTOR GENERAL
OFFICE OF INVESTIGATIONS

CLOSEOUT MEMORANDUM

Case Number: A07100053

We referred allegations of fabrication and falsification of data to a university[1] following our inquiry into the allegations against a former post-doctoral researcher (post-doc)[2] and his mentor.[3] During the period of the alleged misconduct the mentor was a CAREER awardee[4] and provided acknowledgement to that award in some of the publications involved. The university conducted a full investigation in which it determined that both the post-doc and his mentor had committed research misconduct. The university found that the post-doc had hands-on responsibility for the misconduct. It also found that the mentor, once he had substantial reason to know of the misconduct, continued to use the suspect results to the point of committing research misconduct himself.

We concurred with the university investigation and identified additional allegations based on the admissions of both the post-doc and mentor in their interviews, specifically the knowing falsification of the methodology reported in a published article. We recommended NSF make findings of research misconduct (report attached) and recommended debarments. Because of the ongoing risk to federal funds during the adjudication, NSF implemented our recommendation for government-wide suspensions for both pending a final determination.

NSF made findings of research misconduct (attached) to which both the post-doc and the mentor appealed. Following the appeals, NSF modified its imposed actions in its final notice of debarment to both (attached).

Accordingly, this case is ***closed***.

1 [redacted]
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National Science Foundation
Office of Inspector General

Report of Investigation
Case Number A-07100053
February 21, 2014

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Executive Summary

Allegation:

Falsification and fabrication of data in publications produced with NSF funding and cited as prior results in subsequent NSF proposals.

OIG Inquiry:

Published results citing an NSF CAREER award for support were later reported as irreproducible. Review of the literature and interviews showed sufficient substance to warrant an investigation for data falsification and fabrication in three areas of research from a single research group. We referred the investigation to the University with respect to a former postdoctoral associate (Subject 1) and the PI (Subject 2).

University Investigation and Action:

The University concluded: Subject 1 intentionally (purposefully) fabricated data in all three areas of research; other areas of Subject 1's research were called into question; and Subject 2 acted recklessly in his continued use and presentation of that data in publications and proposals when he had reason to know the data were unsupported. Subject 1 is no longer at the University, thereby limiting its actions. The investigation committee recommended a reassessment of Subject 2's promotion to full Professor. Subject 2 was not demoted, but the University required monitoring of his research program. The committee recommended that Subject 2 retract eight publications and repeat other questioned work to correct the literature.

OIG's Assessment:

Subject 1

- **The Act**: Falsification and fabrication in 8 publications and in one declined NSF proposal.
- **Significant Departure:** Subject 1's actions were a significant departure from the accepted practices of the relevant research community.
- **Intent:** Subject 1's actions were knowing and intentional (purposeful).
- **Standard of Proof:** The preponderance of the evidence supports a finding of research misconduct.
- **Pattern:** The absence of supporting data, timing of purchase orders, and experimental methodology support finding a pattern of misconduct in Subject 1's other research activities in Subject 2's laboratory.

Subject 2

- **The Act:** Falsification and fabrication in 8 publications and 2 awarded NSF proposals.
- **Significant Departure:** Subject 2's actions were a significant departure from the accepted practices of the relevant research community.
- **Intent:** Subject 2's actions were reckless, knowing, and intentional.
- **Standard of Proof:** The preponderance of the evidence supports a finding of research misconduct.
- **Pattern:** Subject 2's continued use of "highly suspect data" and publication of corrections/errata obfuscating the problems with the data constitute a pattern of conduct in support of the falsification.

OIG Recommendation:

Subject 1

- Send a letter of reprimand.
- Require certification of training within 1 year of NSF's finding.
- Terminate Subject 1's current NSF awards.
- Require certification of retractions.
- Debar Subject 1 for 5 years.

Additionally for a period of 5 years immediately following the debarment period:

- Bar from participating as a peer reviewer, advisor, or consultant for NSF.
- Require certifications and assurances.
- Require submission of detailed data management and mentoring plans with annual certifications of adherence to those plans.

Subject 2

- Send a letter of reprimand.
- Require certification of training within 1 year of NSF's finding.
- Require certification of data review and retractions within 1 year.
- Debar Subject 2 for 3 years.

Additionally for a period of 5 years immediately following the debarment period:

- Bar from participating as a peer reviewer, advisor, or consultant for NSF.
- Require certifications and assurances.
- Require submission of detailed data management and mentoring plans with annual certifications of adherence to those plans.

OIG's Inquiry

We assessed an allegation that Subject 1[1] and his postdoctoral mentor Subject 2[2] fabricated or falsified data published in a 2002 journal article (Article 1).[3] Article 1 reported the isolation and differing biological activities of two different stereoisomers (Compounds 1 and 2)[4] extracted as a racemic mixture (the Mixture) from Plant 1[5] in high concentrations using Solvent 1.[6] Compounds 1 and 2 have the same atom-to-atom connections but have different three dimensional arrangements around a given atom center. Each stereoisomer may exhibit different biological properties or physical properties as a result of the differing arrangement of atoms around the stereocenter. In the present case, Subject 1 and Subject 2 reported in Article 1 that Compound 1 had [redacted] properties, and Compound 2 had [redacted] properties.

The data were the basis for at least six subsequent journal articles[7] published through early 2006, and the data were used to support subsequent requests for funding from NSF[8,9] and other sources.[10] These articles acknowledged Subject 2's NSF CAREER award[11] as providing support for the research, although only a few of these papers are referenced as required in his final report to NSF.[12]

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[1] [redacted] was a postdoctoral associate [redacted] at the time of the alleged acts. He is presently [redacted]

[2] [redacted]

[3] Tab 1, Article 1. For ease of discussion and given the importance of chronology in our analysis, all relevant published articles, corrections, errata, and retractions discussed in this report are arranged in chronological order by publication date and numbered sequentially. Furthermore, throughout this report we refer to the OIG-generated page numbers appearing in the lower right corner preceded by the case number. The page numbering is sequential from Tab 1 through Tab 72.

[4] The two compounds are [redacted] (Compound 1) and [redacted] (Compound 2). The (+) and (–) designate each compound's interaction with plane polarized light, the former causing a clockwise rotation and the latter a counterclockwise rotation. The racemic mixture (the Mixture) is a 1:1 mixture of the + and – stereoisomers commonly written as [redacted]

[5] [redacted]

[6] [redacted], a non-polar solvent.

[7] Tabs 7, 8, 10, 13, 17, and 18.

[8] Awarded NSF proposals, Tabs 62 and 64.

[9] Non-awarded NSF proposals related to the [redacted] work are available on request and include: [redacted] See Tab 60.

[10] See Tab 58.A for a summary of acknowledged funding sources as reported in the publications involved in this investigation.

[11] Tab 62, NSF award [redacted] In addition to the base award, Subject 2 requested and received [redacted] supplements to this award for an additional [redacted]. The supplemental award numbers are: [redacted] The supplements requested funding for activities such as participant support for student travel and Research Experiences for Undergraduates (REU) students.

[12] Tab 63 at 2102 – 2103 and 2107 – 2108.

[redacted][13] subsequently published two papers[14] reporting an inability to reproduce the results reported in Article 1. Neither of the papers included Subject 1 or Subject 2 as coauthors. These papers raised concerns about the reproducibility of extracting the Mixture with Solvent 1 and the validity of the high concentrations of the Mixture reported. These papers described the extraction of the Mixture using a different solvent (Solvent 2),[15] yielding much lower concentrations than reported in Article 1 while obtaining no quantity of the Mixture when using Solvent 1.[16]

In 2007 Subject 2 was coauthor on a paper cautioning against reliance on the previously reported studies and specifically noting that control samples had not been used in that work.[17] However, the paper was not a retraction or correction of Article 1 despite intimating that the previously published data are unsupportable.

To assess whether there was sufficient substance to warrant an investigation, we interviewed several current and former University 1[18] faculty and staff.[19]

Several of the interviewees described a collaborative experiment within the College[20] between the laboratories of Subject 2, Witness 8, and Witness 19. Witness 8 and Witness 19 received the Mixture in batches from Subject 1 for testing via foliar application. The batches were inconsistent in color and smell. Those that tested positively were later determined to contain compounds other than the Mixture, specifically an [redacted] agent (Compound 3)[21] and a known [redacted].[22] Witness 8's colleague at a USDA research center (USDA Scientist)[23] confirmed the presence of these extraneous compounds. Each lab asserted that the other was the source of the "contamination;" however at the time of the experiments, only Subject 2's lab appeared to possess [redacted] from a commercial source. These events led

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[13] Witness 6. To maintain consistency through this report and facilitate alignment with the University investigation report, the witnesses have been numbered according to the order the Investigation Committee interviewed them. A glossary for the Witness coding scheme used throughout this report is located at Tab 57.

[14] Tabs 16 and 19.

[15] [redacted] a polar solvent.

[16] While it is not inconceivable that the Mixture could dissolve to some extent under favorable conditions (such as the presence of other natural products or compounds in the same extraction solutions), the large concentration reported in Article 1 at the purity claimed seems unlikely based on the general principle of like-dissolves-like and the reported solubility of Compounds 1 and 2. Reported solvents for Compounds 1 and 2 include: methanol (*CRC Handbook of Chemistry and Physics* 65th edition); alcohol, hot water, glacial acetic acid, and acetone. The compounds are also reported to be slightly soluble in cold water or ether, and practically insoluble in benzene, chloroform, and petroleum ether (Merck Index, 11th edition).

[17] Tab 21 at 182 and 186.

[18] [redacted]

[19] We spoke with Witnesses 1, 3, 5, 6, 8, 12, 13, 16, Witness 5's postdoc (a coauthor on Article 24), and Subject 2's current postdoctoral fellow. We also conducted a telephonic interview with a former post doctoral associate in Subject 2's research group, presently at [redacted], who provided sufficient information to corroborate statements made by others in the inquiry.

[20] [redacted].

[21] [redacted], a known [redacted] agent.

[22] [redacted]

[23] [redacted] USDA Agricultural Research Service (ARS), [redacted]

University 1 to terminate an award from a private funding source[24] intending to commercialize the research results.

Subsequently, Witness 1 discovered similar [redacted] "contamination" in sample blanks[25] that Subject 1 provided to Witness 14, Subject 2's collaborator at another university (University 2).[26] Subject 1 appeared to have primary control over the batches of the Mixture provided to collaborators.

Also as a result of these interviews, the subjects' data involving Compound 3 and Compound 4[27] reported as extracted from Plant 2[28] and Plant 3,[29] respectively, were called into question. Subject 1 and Subject 2 reported these results in Article 10[30] and Article 6,[31] the first published reports of these compounds as natural products.

Consistency in witness accounts indicated Subject 2 was aware of significant problems with data validity, method validity, and the general irreproducibility of Subject 1's' work even before Subject 1 left the lab to take an appointment at University 3.[32] Subject 2 continued to request and to obtain federal funding from NSF and other agencies based on Subject 1's work while suspecting or knowing it to be irreproducible. At least two other University 1 faculty members, Witness 4 and Witness 5, may have also had some knowledge of the questionable work by Subject 1 while participating as Co-PIs on proposals with Subject 2.

We learned that several University 1 faculty raised allegations of research misconduct involving Compounds 1 and 2 with the Dean of the College[33] and two Department Heads.[34] An informal, undocumented evaluation of the allegations at the College level appeared to evolve into an informal inquiry outside of University 1's prescribed policy, including analyses of the batches of the Mixture and blind tests of the extraction methodologies reported in Article 1.[35] The Dean relied on Witness 5 as a subject matter expert as part of this inquiry despite the conflict of interest arising from Witness 5's collaboration with Subject 2 in the questioned work. The undocumented conclusion to the College's "inquiry" was to allow the issue to resolve itself in the scientific literature.

Given the above, we found sufficient substance to warrant a detailed investigation of the work of both Subject 1 and Subject 2 with Compounds 1 through 4. Furthermore, there was sufficient substance to warrant investigation of Subject 2's alleged awareness and use of fabricated or falsified data in order to obtain additional funding from NSF.

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[24] [redacted]

[25] In this case blanks are samples prepared for analysis without Compound 1, Compound 2, or the Mixture. They essentially contain only the solvent used in the analytical procedure.

[26] [redacted].

[27] [redacted] a known [redacted]

[28] [redacted]

[29] [redacted]

[30] Tab 10, Article 10.

[31] Tab 6, Article 6.

[32] [redacted]

[33] Witness 16.

[34] Witness 12 and Witness 13.

[35] Tab 21 at 186.

Because of the breadth of the allegations with respect to Subject 1's work during his time in Subject 2's group and the reported abrupt inability of the lab to reproduce the results following his departure, we requested University 1 consider whether the evidence supported allegations in other research projects in which Subject 1 was involved under Subject 2's direction. We also requested University 1 consider whether Subject 2, or any of his coauthors or CoPIs, knew or had reason to know of the alleged falsification or fabrication such that continued use or presentation of the data at any time constituted research misconduct.

University 1's Investigation[36]

University 1 appointed an investigation committee (the Committee)[37] under its research misconduct policy.[38] University 1 charged the Committee with investigating two allegations encompassing the matter we referred:

> *Allegation 1*: Falsification or fabrication of the [Subjects'] original results with [Compounds 1, 2, 3, and 4], as well as other work in [Subject 2's] laboratory deriving from this work.
>
> *Allegation 2*: Awareness and use of fabricated and/or falsified data in order to obtain additional funding from federal agencies.[39]

The Committee reviewed research records that the University 1 Research Integrity Officer (RIO) secured prior to the Committee's formation and during the investigation.[40] The Committee interviewed 21 individuals including Subject 1 and Subject 2.[41] The Committee reviewed chemical reagent purchasing records for Subject 2's lab[42] and also engaged the services of an outside lab[43] to perform carbon dating and stable carbon isotope analyses. As a consequence of the volume of evidence, we extended the referral period to allow the Committee sufficient time to review and evaluate it.[44]

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[36] Tabs 34 – 47, University 1's Investigation Report.
[37] Tab 35, Investigation Committee CVs.
[38] Tab 33, University 1's Research Misconduct Policy and Procedure.
[39] Tab 34 at 263.
[40] Tab 34 at 264; and Tab 38.
[41] Tab 39.
[42] Tab 40 at 1229 – 1253, and Tab 68.
[43] National Ocean Sciences Accelerator Mass Spectrometry Facility (NOSAMS) at the Woods Hole Oceanographic Institute (WHOI). See Tab 40 at 948 – 951.
[44] 45 C.F.R. 689.4(b)(4).

Allegation 1: Compounds 1 and 2

The Committee determined the following with respect to the Mixture reportedly isolated from Plant 1:

- Plant 1 has been reported by others to produce either Compound 1 or Compound 2 as a metabolite, but those researchers have not verified the chirality of the metabolite (*i.e.*, determined whether it is Compound 1, Compound 2, or the Mixture).[45]

- Article 1 reported Subject 1's extraction of the Mixture from Plant 1 in Solvent 1 and subsequent isolation in concentrations averaging [redacted] µg/ml, as confirmed by nuclear magnetic resonance (NMR) spectroscopy and circular dichroism (CD) spectroscopy on samples provided to Witness 5.[46] Subject 2's lab reported the same method again in Article 8 with a yield [redacted] lower than reported in Article 1.[47] Subject 1 was a member of Subject 2's lab at that time and also a coauthor on Article 8. The Committee found it "highly unlikely if not impossible that these levels of [the Mixture] could be extracted by this technique because:"[48]

  - Compounds 1 and 2 are "fundamentally insoluble in [Solvent 1]";[49]

  - In October 2004, Witness 7 prepared two blind sets of samples to be analyzed by Subject 2's lab and Witness 6's lab using the Solvent 2 method as published in Article 16. Subject 1 performed the concentration calculation for Subject 2's lab and failed to identify the concentrations of Compounds 1 and 2 accurately, including reporting concentrations of Compounds 1 and 2 in two blanks. Witness 2 representing Witness 6's lab accurately identified the concentrations of all samples.[50]

  - Article 15 reported no success in using Solvent 1 for the extraction, noting Compounds 1 and 2 remain in the aqueous layer.[51] The same article reports "several orders of magnitude" less of Compounds 1 and 2 using the Solvent 2 technique.[52]

- Following Subject 1's departure from University 1, Subject 2's group has "consistently failed to find [the Mixture] in other than trace or small concentrations from [Plant 1]" using Solvent 1 or any other method.[53]

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[45] Tab 34 at 278. The Committee was not specific about the other researchers to which it was referring, but it is likely that the committee was referring to Witness 6's group (Article 16 and Article 19).
[46] Tab 34 at 271 and Tab 41 at 1280. Also Tab 1 at 3 and 6.
[47] Tab 34 at 270 and Tab 41 at 1281. Also Tab 8 at 98 – 100.
[48] Tab 34 at 270. Also Tab 41 at 1280.
[49] Tab 34 at 270. Also Tab 41 at 1280.
[50] Tab 34 at 270 and Tab 41 at 1280. See also Tab 39 at 567 – 570 and Tab 40 at 961 – 1096.
[51] Tab 34 at 270 and Tab 41 at 1280. See also Tab 16 at 145 – 146.
[52] Tab 34 at 270 and Tab 41 at 1280. See also Tab 16 at 147.
[53] Tab 34 at 270 and Tab 41 at 1281 – 1282.

- The Mixture appeared in the blanks Witness 1 provided to Subject 1 for analysis, but did not appear in blanks she maintained outside of Subject 2's lab at the same time.[54] "No alternative adventitious source" of the compounds was discovered after "extensive efforts" in Subject 2's lab.[55]

- Witness 5 deemed the "exceptional purity" of samples for NMR identification to be "too pure" to have been extracted as reported based on the NMR spectra.[56]

The Committee also concluded samples of the Mixture provided by Subject 1 to Witness 8 for testing on plants "were purposefully mixed with [and Compound 3] as all three compounds appear in approximately equal amounts, 1:1:1; or 4:1:1 in some samples"[57] as determined by the USDA Scientist at the time. Both Subject 2's lab and Witness 8's lab had commercial forms of and Compound 3 available.[58] The contamination "would advance the [Mixture] story and the primary motivation to do so would lie with [Subject 2's] laboratory (and specifically [Subject 1] who provided the samples) . . . ."[59] The Committee wrote that "it is more likely than not that misconduct occurred" but also noted that it "could not find sufficient supporting evidence of misconduct" with respect to this specific instance of "contamination."[60]

Thus, the Committee concluded that Subject 1 intentionally fabricated data with regard to the Mixture.[61]

Allegation 1: Compound 3

The Committee determined the following with respect to the reported work involving Compound 3 isolated from Plant 2:

- Carbon (^{14}C) dating[62] and isotopic ($^{13}C/^{12}C$) ratio analyses[63] conducted by an outside lab on a sample provided by Subject 1 as a natural product isolate to Witness 5 for NMR analysis indicated that the sample was not naturally produced (*i.e.*, by any plant). The analyses indicated that Subject 1's sample matched a synthetically produced, commercially available standard reference sample of Compound 3, which was prepared from petrochemicals.[64]

- The "physical characteristics . . . (specifically, its exceptional purity)" of Subject 1's sample supports the outside lab's finding that it is a reagent-grade synthetic sample.[65]

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[54] Tab 34 at 271 and Tab 41 at 1281 – 1282. See also Tab 39 at 423 – 426.
[55] Tab 34 at 271. See also Tab 39 at 426, 652 – 653, 689 – 699, 823 – 827, 855 – 856, and 864 – 865.
[56] Tab 34 at 271. Also Tab 39 at 1282. See also Tab 39 at 520 – 521.
[57] Tab 34 at 271.
[58] Tab 34 at 271. See also Tab 1 at 3 wherein the Subjects compare biological activities of the Mixture and 2,4-D.
[59] Tab 34 at 271.
[60] Tab 34 at 271.
[61] Tab 34 at 271.
[62] Tab 40 at 949.
[63] Tab 40 at 948 – 949.
[64] Tab 34 at 269, Tab 40 at 949, and Tab 41 at 1279.
[65] Tab 41 at 1279. See also Tab 34 at 269.

- The "extraordinary purity of the NMR spectrum, and its superimposibility with the standard from Sigma Chemical" supports the conclusion that the sample was a commercial product and not a natural product isolated from Plant 2.[66]

- The "subsequent failure by natural products trainees to reproduce the reported results supports the falsification [*sic*]" of Compound 3 as a natural product from the exudate of Plant 2.[67]

- Compound 3 was found associated with Plant 2 "*only* during the physical presence of [Subject 1 which] provides further corroborating evidence for the finding of falsification [*sic*] of the original work by [Subject 1]."[68]

- Compound 3 "appeared in the hybridization experiments of [Student 1][69] when samples [submitted to Subject 1] were clearly marked, and that the results by [Subject 1] were random when the samples were provided to him blinded."[70]

The Committee considered as mitigating evidence a paper[71] by an outside research group which reported Compound 3 as a natural product of Plant 2. However, the Committee noted Witness 5 expressed "disbelief" in the finding and methodology reported in that paper.[72] The Committee noted that the concentrations reported in 2004 in Article 10 were 4 to 5 orders of magnitude greater than those reported by the independent group in 2008.[73] Also, the Committee found that Subject 1 reported Compound 3 to be stable in soil whereas the 2008 paper reports instability and rapid dissipation.[74] The Committee attributed stronger evidentiary weight to the carbon dating data, isotopic ratio data, and the contrasts with the 2008 paper.[75]

Thus, the Committee concluded that Subject 1 fabricated data[76] with regard to Compound 3.[77]

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[66] Tab 34 at 269. See also Tab 39 at 520 – 521
[67] Tab 34 at 269.
[68] Tab 34 at 269.
[69] [redacted] a graduate student in Witness 6's laboratory.
[70] Tab 34 at 269; Tab 41 at 1279. See also Tab 40 at 1262 – 1277 (Withdrawn Manuscript.)
[71] [redacted] (Tab 46 at 1484 – 1494).
[72] Tab 34 at 269 – 270. See also Tab 39 at 928.
[73] Tab 34 at 270. See also Tab 10 at 121 and Tab 46 at 1490.
[74] Tab 34 at 270. See also Tab 10 at 121 and Tab 46 at 1492.
[75] Tab 34 at 270.
[76] We note that the Committee found fabrication, but it discussed the evidence in terms of supporting falsification. Generally, the former is the creation of data from nothing and the latter the misrepresentation of data collected. In many instances, the same data and results can be both fabricated and falsified, thus the same evidence can support both of NSF's definitions.
[77] Tab 34 at 269. See also Tab 41 at 1279.

Allegation 1: Compound 4

The Committee determined the following with respect to the reported work involving Compound 4 isolated from Plant 3:[78]

- Carbon (^{14}C) dating and isotopic ($^{13}C/^{12}C$) ratio analyses conducted by an outside lab on a sample provided by Subject 1 as a natural product isolate to Witness 5 for NMR analysis indicated the sample was not naturally produced (*i.e.*, by any plant). The analyses indicated that Subject 1's sample matched a synthetically produced, commercially available standard sample of Compound 4, which was prepared from petrochemicals.[79]

- Subject 1 presented an NMR spectrum acquired at another facility[80] as evidence of the isolation of Compound 4 as a natural product.[81] The "extraordinary purity of the NMR spectrum, and its superimposability with the standard sample further supports the finding that the alleged natural sample was from a synthetic source."[82]

- The Committee was unable to locate the original NMR data generated at an off-site lab, "and therefore cannot provide conclusive proof of [that lab's] interpretation."[83]

- Purchase records for Subject 2's lab indicate that Compound 4 was present in his lab prior to Subject 1 providing the sample to Witness 5.[84]

- Subsequent trainees[85] failed to reproduce the reports of Compound 4's isolation from exudates of Plant 3, supporting the falsification allegation with respect to Compound 4.[86]

- Compound 4 was found associated with Plant 3 "*only* during the physical presence of [Subject 1 which] provides further corroborating evidence for the finding of falsification [*sic*] of the original work by [Subject 1]."[87]

Thus, the Committee concluded that Subject 1 fabricated[88] data with regard to Compound 4.[89]

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[78] Tab 34 at 268 – 269.
[79] Tab 34 at 268 and Tab 41 at 1278. See also Tab 40 at 948 – 951.
[80] [redacted].
[81] Tab 34 at 269. See also Tab 41 at 1278.
[82] Tab 34 at 269. See also Tab 39 at 520 – 521
[83] Tab 34 at 269. See also Tab 41 at 1278.
[84] Tab 34 at 269 and Tab 41 at 1278. See also Tab 68 at 2271 – 2273.
[85] Including Witness 3 (Tab 41 at 1278), the coauthors on Article 24 (Tab 24 at 210 and 212; and Tab 41 at 1278) and Witness 15 (Tab 41 at 1279). When asked whether her published data should be retracted, Witness 15 responded: "Correct. I think what I have here is correct, but what is unknown is whether or not it is [Compound 4]. Umm so… Yes, we don't have an actual positive ID that that is [Compound 4] for sure, so." (Tab 39 at 800).
[86] Tab 34 at 269. See also Tab 41 at 1278 – 1279.
[87] Tab 34 at 269. See also Tab 41 at 1278 – 1279.
[88] See footnote 76.
[89] Tab 34 at 268.

Allegation 1: Other Data Concerns

The Committee identified two additional papers, Article 5 and Article 2, in which it finds the data suspect based on the "pattern of purchase records" and "extraordinary sample purity."[90] As a result the Committee determined that "these publications are highly suspect and are included for retraction by the authors" in the Committee's recommendations.[91] However, the Committee made no explicit research misconduct finding with respect to the data in these papers.

Allegation 2: Continued Use of Data

The Committee considered an allegation of falsification or fabrication with respect to Subject 2's awareness and continued use of data falsified or fabricated in his lab.[92] The Committee noted that beginning in October 2004, "there was a loud chorus of individuals, comprised of faculty colleagues, graduate students and research associates, who raised serious concerns about the validity of the data being generated in [Subject 2's] laboratory concerning not only Compounds 1 and 2, but several other substances alleged to have been natural metabolites of the plant species under study."[93] The Committee concluded:

> The fact that concerns were raised by not one or two individuals, but rather numerous individuals with whom [Subject 2] was collaborating, interacting with and in the case of students and post-docs, advising, reveals that [Subject 2] had substantial evidence in front of him between 2004 and 2007 that fraudulent or questionable data were being generated in his laboratory.[94]

[90] Tab 34 at 271.
[91] Tab 34 at 271.
[92] Tab 52 at 1594.
[93] Tab 34 at 272.
[94] Tab 34 at 272.

The Committee summarized this in the form of a general timeline including:

2004	· the failure of Witness 6's lab[95] to reproduce the extraction of the Mixture; · Subject 1's failure to accurately identify the Mixture in blind samples; · the confrontational lab group meeting with Witness 4's group and subsequent lapse in communication;
2005	· failure of Subject 2's own graduate students to reproduce the extraction of the Mixture using either Solvent 1 or Solvent 2; · Subject 2's failure to disclose the lack of reproducibility to his funding agencies or through correction of the literature; · withdrawal of Witness 19 as a CoPI on a Department of Defense (DOD) award because of Witness 19's concerns about the data;[96] · Witness 1's experiments with the blind samples provided to Subject 1 for analysis; and
2006	· Subject 2's email correspondence with Witness 5 regarding sample purity.

The Committee also wrote:

> Following the period October, 2004-February, 2006, [Subject 2] knew, or should have known as would a reasonable scientist, of considerable evidence indicating that [Subject 1] had likely fabricated data with regard to [Compounds 1 through 4], [Subject 2] recklessly continued to cite the suspected studies in NSF Progress Reports, in a USDA grant proposal, and in numerous publications.[97]

[95] Specifically, Witness 10 and Witness 2.
[96] The Committee noted that this particular fact is "highly significant." (Tab 34 at 272.)
[97] Tab 34 at 273.

The Committee noted that after Subject 2 had taken his concerns about the data to University officials in Spring 2006, Subject 2:

> continued to cite and use the original [Compounds 1 and 2] articles without qualification (other than a contrast to [Article 16]) to advance the [Mixture] story in grants, annual reports and publications, up to and including 2008.[98]

The Committee identified five examples of ongoing citation in its report including: an annual report for NSF Award 2,[99] an unfunded USDA proposal in December 2006;[100] a published 2008 paper;[101] Article 20 submitted in August 2006 and revised in January 2007;[102] and Subject 1's communications with a DOD funding component regarding an ongoing award in which he "trivialized the importance" of the identification of [redacted] contamination in the work with the Mixture.[103] The Committee also included in an appendix additional details and examples of continued use through ongoing citation.[104]

The Committee treated as mitigating evidence Witness 12's[105] initiation of a "preliminary investigation of potential misconduct" shortly after Subject 2's and Witness 6's combined group meeting in October 2004. The Dean of the College[106] directed Subject 2's Department Head[107] to conduct several interviews and report back to him.[108] The outcome of this "report"[109] was "the general recommendation to [Subject 2] that [the issue] should be worked out in the literature."[110] Thereafter in the Spring of 2006, Subject 2 initiated a meeting with the College research integrity officer (RIO)[111] to discuss possible allegations of research misconduct against Subject 1. The Committee determined that the College RIO's "general recommendation to [Subject 2] was that nothing could be proven and that it should be worked out in the literature."[112] Witness 17 also told the Committee: "Yes, I told [Subject 2] to deal with it in the literature, but no, I never told him to withhold that information from a funding agency."[113]

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[98] Tab 34 at 273 – 274.
[99] Tab 34 at 274, specifically identifying [redacted] and a supplement [redacted]. (Tabs 64 and 65).
[100] Tab 34 at 274, specifically identifying USDA [redacted] Proposal. (Tab 40 at 1097 – 1150).
[101] Tab 34 at 274and Tab 40 at 1222 – 1228.
[102] Tab 34 at 275. See also Tabs 20 and 58.B.
[103] Tab 34 at 275. See also Tab 40 at 1208 – 1209.
[104] Tab 43.
[105] [redacted]
[106] Witness 16.
[107] Witness 13.
[108] We note that Witness 12, who was the acting Research Integrity Officer for the College, initiated the University process for reviewing the allegation, but was later replaced by the Dean (Witness 16) because he was Witness 6's Department Chair. Instead, Witness 16 appointed Subject 2's Department Chair (Witness 13) to conduct the informal inquiry/investigation for the College. It is unclear how Witness 13 would not have also been unable to be completely objective.
[109] The Committee's reference to a "report" may overstate the degree to which this "preliminary investigation" was memorialized. (Tab 40 at 1210 – 1214.)
[110] Tab 34 at 276.
[111] [redacted]
[112] Tab 34 at 276.
[113] Tab 34 at 277. See also Tab 39 at 840.

With regard to Compounds 3 and 4, the Committee noted that the literature accomplished the corrective function as recommended by the College administration through the subsequent publication of work contrary to Subject 1's results.[114]

Although the Committee specifically acknowledged and addressed the advice Subject 2 received from University administrators, the Committee found that it was unclear how forthcoming Subject 2 had been with those University 1 administrators about the reasons he believed research misconduct may have occurred in his lab.[115] The Committee weighed "the advice to correct discrepancies in the literature" against "what a reasonable scientist would do under these circumstances."[116] It concluded that a reasonable scientist "should have reported his well-founded suspicions about probably [*sic*] research misconduct to granting agencies (which he did in most cases and to some degree)."[117] The Committee noted it "acknowledges that the response of the [University 1] administration to these allegations was inadequate (particularly in 2006) and did not follow the Research Misconduct Administrative Procedures."[118]

Moreover, the Committee found that Subject 2 "was poorly served by his direct supervisor [Witness 13]," writing:

> the Committee believes that the tone of these discussions was set in large part by [Witness 13]. Had [Witness 13] advised [Subject 2] to address the allegations seriously rather than characterizing them as arising from petty jealousies from hostile colleagues, it is likely that this administration's response would have been different.[119]

The Committee also identified as significant the fact that Subject 2 instructed his trainees to reproduce the work with the Mixture, which resulted in the falsely confirmatory results they received before Subject 1 left the lab and the failure to reproduce the results afterward.[120] Thereafter, Subject 2's lab repeated the original studies and corrected the published literature on Compounds 3 and 4 through efforts initiated prior to this investigation.[121]

Thus, the Committee concluded that, in light of the mitigating evidence Subject 2 "did not knowingly or intentionally commit research misconduct via data fabrication or alteration, but was reckless in his use of highly suspect data to the point of misconduct."[122]

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[114] Tab 34 at 276.
[115] Tab 34 at 277.
[116] Tab 34 at 277.
[117] Tab 34 at 277. There is no evidence of an attempt by Subject 2 to notify NSF or USDA of such concerns. At best it seems that the DOD funding source was notified of a problem, but not the full extent of it. Subject 2's other funding appears to come primarily from University 1's Agricultural Extension Station. See Tab 58.A.
[118] Tab 34 at 277.
[119] Tab 34 at 277.
[120] Tab 34 at 277.
[121] Tab 34 at 277.
[122] Tab 34 at 277.

Additional Misrepresentation of Compound 2's Use

Subject 2 "voluntarily revealed" in his interview with the Committee that he had used the Mixture in his experiments but that he had "intentionally stated" in the methods he reported in several publications that they had used only Compound 2 in an isolated form.[123] Subject 2 admitted to dividing the concentration of the Mixture in half and reporting the concentration as if only Compound 2 had been used.[124] The Committee determined that "[t]his constitutes a serious breach of scientific protocol and is a reckless act. . . . The related results of these papers are null and void as the contributing factor, [Compound 1 or 2 or both], cannot be resolved."[125] The Committee acknowledged Subject 2's belief at the time that only Compound 2 had [redacted] activity, a belief that Subject 2 later showed to be incorrect.[126] As a result of Subject 2's "reckless representation" that Compound 2 was used when the Mixture was used, the literature from Subject 2's lab is "confused" such that it has not been determined whether Plant 1 exudes Compounds 1, 2, or both.[127] The Committee found that the confusion cannot be resolved until it has been determined that Plant 1 in fact produces Compound 1, 2, or both.[128] Thus, the Committee focused its analysis of the misrepresented use of Compound 2 primarily on Subject 2's actions in relation to Subject 2's continued use of suspect data and not as an additional allegation of misconduct.

Laboratory Atmosphere

The Committee considered the atmosphere of Subject 2's laboratory in response to an observation in our referral letter that Subject 2 may have created an environment which could have led his group members, including Subject 1, to produce data under duress to support his hypotheses. The Committee made "several disconcerting findings":

> Laboratory individuals interviewed, including [Subject 1], indicated that [Subject 2] created a very tense laboratory setting focused on generating data that positively fit the prevailing hypothesis of the experiments. While some in the laboratory did keep laboratory notebooks, this was not a requirement, nor were there any standards as to the detail that must be included. Thus, reproduction and publication of experiments would be difficult as much detail concerning methodology would be lost with turnover of laboratory personnel.[129]

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[123] Tab 34 at 277. See also Tab 44.
[124] Tab 34 at 277. See also Tab 44.
[125] Tab 34 at 277 – 278.
[126] Tab 34 at 278.
[127] Tab 34 at 278.
[128] Tab 34 at 278.
[129] Tab 34 at 278 – 279. For laboratory setting, see Tab 39 at 617 (Witness 9 – describing publish or perish philosophy), 638 (Witness 10 – describing lack of chairs so that they would be working and not sitting), 801 (Witness 15 – describing lack of "oversight or advice"), 862 – 863 (Subject 1 – describing workload and pressure) and 874 (Subject 1 – "he's very ah hard taskmaster so he wants ah to people to always do more than what they really can do.") For laboratory notebooks, see Tab 39 at 651 (Witness 11 – no standard protocols for keeping notebooks) and 700 (Subject 1 – admitting "I don't actually ask ah people in my lab to actually keep notebooks.")

The Committee's final recommendations reflect its assessment that "specific remedial action directed at improving the laboratory procedures" in Subject 2's lab are warranted.[130]

The Subjects' Responses to University 1's Draft Investigation Report

Subject 1 and Subject 2 each responded separately to the Committee's Draft Investigation Report.[131] Both independently raised similar concerns,[132] with Subject 1 raising additional concerns.[133] The Committee determined that it lacked sufficient purview to address Subject 1's allegations of unethical conduct on the part of Subject 2 related to both lab practices (*i.e.*, inability to reproduce data) and financial misconduct in Award 1.[134]

The Committee modified only its timeline in response to the concerns raised; otherwise, its report remained unchanged.

The University's Action Against the Subjects

The Committee's Recommendations

The Committee recommended retraction/correction of 8 articles.[135] The Committee focused all other recommendations on Subject 2 because Subject 1 is no longer an employee of University 1. These recommendations were that:

- Subject 2 should submit all grant applications, annual reports, and publication submissions for a period of three years for review by the Dean of the College.[136]
- Subject 2 should be mentored according to a plan established by the Dean of the College in "proper scientific laboratory protocols to document techniques and procedures (*e.g.* well documented laboratory notebooks, standardized laboratory procedures . . .), to use appropriate scientific techniques with regard to good laboratory science."[137]
- Subject 2 should repeat the work on the extraction of the Mixture from Plant 1.[138]

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[130] Tab 34 at 279.
[131] Tab 45: Subject 1's Response; and Tab 46: Subject 2's Response.
[132] Tab 34 at 266 – 267.
[133] Tab 34 at 267.
[134] We independently reviewed the University general ledger accounts associated with Award 1 and its numerous awarded supplements. We found insufficient substance with respect to NSF funds to warrant further investigation of those allegations against Subject 2.
[135] Article 1, Article 2, Article 5, Article 7, Article 8, Article 10, Article 17, and Article 20. Tab 34 at 279 – 281. See also Tab 58.B identifying retractions and corrections published.
[136] Tab 34 at 281.
[137] Tab 34 at 281.
[138] Tab 34 at 281.

- Subject 2 should be considered for demotion by one academic rank, because "much of the science used in the promotion . . . was known by [Subject 2] to be highly suspect, and because [he] continued to use those data recklessly to advance his career . . . ."[139]

The Deciding Official's Determination

With respect to Subject 1, the University 1 Deciding Official[140] (DO) accepted the Committee's report and found by a preponderance of the evidence: his actions constitute research misconduct; his actions were "a significant departure from the accepted practices of the relevant research community"; he committed the acts "intentionally"; his actions were "part of a pattern of behavior, and not an isolated event"; and his actions "had a significant impact on the research record, other researchers, institutions and public welfare."[141] The DO's findings with respect to Subject 1 were the same for acts prior to and after April 17, 2002. There was no finding with respect to any of Subject 1's subsequent use of falsified or fabricated data in proposals because University 1 identified no proposals submitted by Subject 1 while he was employed by University 1.[142]

With respect to Subject 2, the DO accepted the Committee's report and found by a preponderance of the evidence: his actions *before* April 17, 2002, *do not* constitute research misconduct; his actions *after* April 17, 2002, *do* constitute research misconduct; his actions *after* April 17, 2002, were "a significant departure from accepted practices of the relevant research community"; and he committed those acts "recklessly and not merely carelessly"; his actions were "part of a pattern of behavior, and not an isolated event"; and his actions "had a significant impact on the research record, other researchers, institutions and public welfare."[143] The DO accepted the recommendations of the Committee and referred the matter of demotion from Full Professor to Associate Professor to the disciplinary committee at University 1.[144]

The Subjects' Appeals to University 1

Both subjects submitted appeals to the DO's decision. Given the complexity of the present case, we continued to defer our investigation pending the finality of University 1's process with respect to the appeal.

The University Appellate Official (AO)[145] denied both appeals.[146] The AO did not provide a point-by-point response noting that he was not required to do so by University 1 policy. With respect to Subject 2, the denial of the appeal included notification that procedures

[139] Tab 34 at 281.
[140] [redacted]
[141] Tab 47 at 1577 – 1578.
[142] Tab 47 at 1578.
[143] Tab 48 at 1581 – 1582.
[144] Tab 48 at 1582 – 1583.
[145] [redacted]
[146] Tab 51.

for implementing the recommended demotion would commence.[147] University 1 completed its review of Subject 2's promotion to Professor and determined a demotion was unwarranted.[148]

OIG's Assessment and Additional Investigation

We notified both Subject 1[149] and Subject 2[150] of our receipt of the University 1 investigation report and invited any additional comments and evidence. Both responded.[151] We have reviewed the University 1 report and conclude that the investigation was accurate, complete, and in accordance with reasonable procedures.[152]

A finding of misconduct requires: (1) there be a significant departure from accepted practices of the relevant research community, (2) the research misconduct be committed intentionally, or knowingly, or recklessly, and (3) the allegation be proven by a preponderance of the evidence.[153] In this particular case, some alleged actions occurred prior to April 17, 2002, and are therefore assessed under NSF's definition of misconduct at that time, which includes "other serious deviation from accepted practices" in addition to fabrication, falsification, and plagiarism.[154] While NSF uses this definition for those specific acts, NSF uses all other aspects (*i.e.*, procedural elements) of the current regulation in determining whether misconduct has occurred.

Our analysis addresses the evidence in terms of the questioned data and conclusions as the subject(s) presented them at the time of the alleged act(s). Subsequent results either confirming or countering the data and conclusions have limited relevance, if any, to the assessment of allegations of misconduct. Confirmation, at best, may mitigate against a finding of wrongdoing but generally is not solely dispositive of an allegation. A subsequent demonstration of improbability may favor a finding of wrongdoing but generally is not solely dispositive of an allegation. Thus, we evaluate the subsequent research within the context of the *totality* of the evidence in the case.

The Act

Falsification and Fabrication of the extraction of Compounds 1 through 4. When we consider the evidence in its totality, we agree with University 1 that the preponderance of the evidence supports concluding that Subject 1 falsified and fabricated data with respect to Compounds 1 through 4 such that his actions were a significant departure from accepted

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[147] Tab 51 at 1588.
[148] [redacted] and [redacted]
[149] Tab 53.
[150] Tab 54.
[151] Tabs 55 and 56.
[152] 45 C.F.R. 689.9(a).
[153] 45 C.F.R. 689.2(c).
[154] For alleged misconduct occurring before April 17, 2002, NSF uses the following definition of misconduct for those actions: "(1) Fabrication, falsification, plagiarism, or other serious deviation from accepted practices in proposing, carrying out, or reporting results from activities funded by NSF; or (2) Retaliation of any kind against a person who reported or provided information about suspected or alleged misconduct and who has not acted in bad faith."

practices. We also agree that the preponderance of the evidence supports concluding that Subject 2 was not physically involved in the falsification and fabrication with respect to the collection and initial reporting of that data.

Falsification in the continued use of the Article 1 data. Both Subject 1 and Subject 2 perpetuated the appearance of the integrity of their work with respect to the extraction of the Mixture through continued use of the data and results in subsequent articles and proposals. At the very least, both were present in October 2004 when "there was a loud chorus of individuals, comprised of faculty colleagues, graduate students and research associates, who raised serious concerns about the validity of the data." [155] The Committee addressed this allegation with respect to Subject 2 because it had no record of Subject 1 submitting proposals from University 1. Given our access to Subject 1's complete NSF proposal portfolio, we address this allegation with respect to Subject 1 as part of our continuation of the investigation.

Subject 1 admitted in his interview that his work with Compounds 1 and 2 at University 1 are the foundation for his current work under NSF awards[156] at his new institution, demonstrating his perpetuation of the falsification and fabrication.[157] Furthermore, we found that Subject 1 used the Mixture data in a NSF postdoctoral fellowship proposal in 2003 submitted from University 1.[158] Subject 1 included a copy of Article 1 and others as support for his proposal.[159] Although NSF returned that proposal without review, Subject 1 acted as his own authorized organizational representative and certified the proposal at the time of submission,[160] thereby explaining why University 1 found no proposals submitted by Subject 1 during his employment. Subject 1 told the Committee that he has continued to work with the Mixture in his position at University 3.[161] We have not reviewed Subject 1's proposals and awards from University 3 for additional research misconduct allegations as part of the current investigation. Those proposals and awards will be reviewed separately to determine whether a referral of investigation to University 3 is warranted.

The evidence also shows that Subject 2 continued to perpetuate the appearance of validity of the Article 1 results about which he had reasonable and significant doubts by using the data in subsequent reports, publications, and proposals. The Committee found that Subject 2's use of the data after Spring 2006, after he had taken his concerns about possible misconduct to University administrators, constituted falsification. We concur, but also find that Subject 2 more likely than not developed sufficient reason to believe that the data lacked adequate experimental support earlier than Spring 2006.

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[155] Tab 34 at 272.
[156] Tab 59.
[157] Tab 39 at 876 – 877.
[158] Tab 61. The proposal cover page contains conflicting information with respect to the awardee institution (University 1) and Subject 1's contact information, which corresponds with his current institution, (University 3). The reverse side of the cover page, however, reflects Subject 1's certification as the AOR with contact information consistent his employment at the University 1 on the date of submission. The apparent discrepancy is a known issue with NSF systems.
[159] Supplemental Documentation submitted as part of the proposal consisted of copies of Article 1, Article 2, Article 3 (uncorrected proof); Article 5, and others.
[160] Tab 61 at 1869.
[161] Tab 39 at 876.

As early as October 2004, both the inability of Witness 6's student to reproduce the extraction in Solvent 1 and Witness 2's analysis of the procedure warranted a reexamination of the Mixture isolated from Plant 1. Thereafter, the impetus for a reexamination was further bolstered in 2005 by: 1) the resignation of Witness 19 from the DOD grant because of his ethical concerns that the work was not supported by the data, 2) Subject 2's student's inability to reproduce the extraction, and 3) University 1's termination of an award from a commercial funder. The Committee noted: "[Subject 2] was clearly aware of the reasons why [Witness 19] withdrew from the . . . grant but he pressed on with both the grant and citing papers that he knew contained questionable or flawed data." Subject 2 did so without acknowledging the legitimate concerns raised by his coauthors on Article 1 in his subsequent proposals or publications. By the time Witness 1 reported her study with the blanks in August 2005, it is clear that the original research required greater scrutiny and any further use of the data without such scrutiny would misrepresent the integrity of the work originally published in Article 1.

Thus, the evidence supports finding that Subject 1 and Subject 2 each continued to perpetuate the use of the falsified and fabricated results and therefore falsified the ongoing research record. Subject 1's continued use of his falsifications and fabrications is on its face a significant departure from accepted practices. Subject 2's continued use of "highly suspect data" in the face of mounting evidence against its integrity is a significant departure from accepted practices.

Falsification of the use of Compound 2. We treat the falsely reported use of Compound 2 when the Mixture was used as a separate and distinct allegation of research misconduct because it is not predicated on the other falsification allegations. We concur with the Committee that reporting the use of pure Compound 2 "constitutes a serious breach of scientific protocol" and renders the "results of these papers null and void as the contributing factor, [Compound 1 or Compound 2] or both, cannot be resolved."[162] The Committee did not treat this as a separate allegation with a separate finding.

Subject 1, Subject 2, and Witness 11 each admitted in their respective interviews that they reported the use of only Compound 2 when in fact they used the commercially acquired Mixture.[163] They each admitted that because of the greater expense of commercially available isolated Compound 2, they chose to use the cheaper commercially available Mixture. They assumed based on results published in Article 1 that Compound 2 was the only [redacted] component, and they reported a concentration one-half of the total Mixture used as the Compound 2 concentration. At no point did they report that Compound 1, which was later shown also to have [redacted] activity, was present in these studies. This left the reader to interpret the published methodology and conclusions in the context of only Compound 2.[164] The

[162] Tab 34 at 262 – 263. We also note that the Committee found this to be a "reckless act" although the Committee also noted Subject 2 "intentionally stated in the methods that they used only [Compound 2]." We provide our analysis of intent with respect to this action on page 21.

[163] Tab 39 at 858 (Subject 1); at 683 (Subject 2); and at 649 (Witness 11). We will consider the allegation of falsification with respect to Witness 11 separate from the present case.

[164] Article 1 attributes the [redacted] effect observed to Compound 2 and only an [redacted] effect to Compound 1. (Tab 1 at 1) Compound 1 has been shown subsequently to have a [redacted] effect, albeit to a lesser degree than Compound 2. (Tab 11 at 124.)

falsely reported use of Compound 2 in isolated form appears in two publications, Article 7 and Article 8.

Subject 2 submitted proposals to NSF specifically to further the Compound 2 work based on the falsified methodology.[165] NSF declined one proposal Subject 2 submitted in July 2002.[166] However NSF awarded the resubmitted proposal (Award 2) which he submitted in May 2003.[167] Subject 2 specifically requested funds for the study of Compound 2 based on the preliminary results of Article 1 and Article 7. He identified Compound 2 by name in the project title. Thereafter, Subject 2 submitted and received an REU supplement in partial support of a student working with Compound 2, in perpetuation of the falsification.[168]

Thus the evidence supports finding that Subject 1 and Subject 2 falsified the methodology they reported with respect to the isomer composition and that Subject 2 perpetuated the falsification in a subsequent NSF proposal and supplement. We concur with University 1 that these acts are a "serious breach of scientific protocol" and therefore we conclude that they constitute a significant departure from the accepted practices of the research community.

Intent

Subject 1. We concur with University 1 that the evidence shows that Subject 1 acted intentionally (*i.e.*, purposefully) with respect to the fabrication and falsification of data, results, and conclusions involving his work with Compounds 1 through 4. The evidence also supports the conclusion that Subject 1 acted purposefully in his ongoing use of the falsified data, results and conclusions for Compound 1 and 2 in his request for NSF postdoctoral support[169] while at University 1 and in his presentation of prior results in NSF proposals from University 3.[170] Furthermore, the evidence shows that Subject 1 acted knowingly in presenting the use of Compound 2 as an isolate when in fact he admits to using a commercially produced Mixture and dividing the concentration by 2.[171]

Thus, the evidence supports finding that Subject 1 acted intentionally in falsifying and fabricating data, results, and conclusions involving Compounds 1 through 4; intentionally in perpetuating the falsification in his subsequent proposals; and knowingly in falsely reporting the use of Compound 2 alone when the Mixture was used.

Subject 2. We concur with University 1 that the evidence shows that Subject 2, at least in his earlier use of the data, acted recklessly "in his use of highly suspect data to the point of misconduct."[172] The evidence shows that Subject 2 continued to promote the veracity of the data and results even when faced with the inability of his own research group to reproduce the results in Article 1 and his growing suspicions of potential misconduct by Subject 1. As his

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[165] Tab 64 at 2138.
[166] [redacted] Tab 60.
[167] Tab 64.
[168] Tab 64 at 2205 – 2209.
[169] Tab 61 at 1874.
[170] Tab 59.
[171] Tab 39 at 858.
[172] Tab 34 at 277.

former colleagues developed evidence from Fall 2004 through Fall 2005 and thereafter, Subject 2's willful disregard for reproducibility elevates his intent to purposefulness. In his subsequent papers, corrections, and errata, he failed to address the reproducibility concerns or explained them with speculative rationale. Notably Subject 2 published a correction for both Article 1 and Article 9, only to be followed by full retractions of those two articles as a result of University 1's investigation.[173] His intent with respect to using the suspect data is mitigated somewhat by his reliance on the advice of colleagues and University 1 administrators. However, the Committee noted that Subject 2 did not provide all of the necessary facts to those advisors thereby limiting the meaningfulness and mitigating effect of following the advice he received.[174]

Separately, Subject 2, by his admission, acted knowingly with Subject 1 in the falsification of the methodology by reporting the use of pure Compound 2 when they used the commercially available Mixture. As such, Subject 2 knowingly perpetuated this falsification in his proposal for Award 2 and the associated REU supplement.

Thus, the evidence supports the finding that Subject 2 acted initially recklessly and later intentionally (purposefully) in his perpetuation of the veracity of Subject 1's falsified and fabricated data, particularly from Article 1. The evidence also supports finding that Subject 2 acted knowingly in falsifying the use of isolated Compound 2 when in fact the Mixture was used.

Standard of Proof

The preponderance of the evidence supports finding that:

- Subject 1 acted intentionally in falsifying and fabricating data, results, and conclusions with respect to Compounds 1 through 4, and knowingly in falsifying methodology with respect to the use of Compound 2 when the Mixture was actually used; and

- Subject 2 acted recklessly, knowingly, and intentionally in his perpetuation of the veracity of Subject 1's falsified and fabricated data; and knowingly in falsifying methodology with respect to the use of isolated Compound 2 when the Mixture actually was used.

OIG's Recommended Disposition

When deciding what appropriate action to take upon a finding of misconduct, NSF must consider:

> (1) How serious the misconduct was; (2) The degree to which the misconduct was knowing, intentional, or reckless; (3) Whether it was an isolated event or part of a pattern; (4) Whether it had a significant impact on the research record, research subjects, other

[173] See Tab 58.B.
[174] Tab 34 at 277.

researchers, institutions or the public welfare; and (5) Other relevant circumstances.[175]

Seriousness

The identification of natural products with [redacted] properties for potential use as active ingredients in ecologically friendly products is a significant goal for environmental as well as commercial endeavors. Subject 1 and Subject 2 published and continued to promote as true the data and results initially reported in Article 1 as significant support for a phenomenon[176] hypothesized for numerous years but difficult to prove.[177] It is therefore significant that Subject 1 and Subject 2 published results in Article 1 and its progeny as conclusive evidence of the phenomenon. Subject 1 and Subject 2 further supported the phenomenon with the falsified and fabricated extractions of Compounds 3 and 4 in the first reports of these compounds as natural products.

Subject 1 and Subject 2 placed particular emphasis on the purported contribution of Compound 2 to Plant 1's invasiveness, a conclusion further advanced through the false reporting of the use of pure Compound 2 in later papers. As noted by the Committee, the papers reporting the use of Compound 2 have further "confused the literature" such that "the literature will not be corrected until this piece of the puzzle has been clarified (this includes the [redacted] controversy)."[178]

As a natural plant-based [redacted], Compound 2 attracted significant attention from federal and commercial funding sources for development of its application as a natural alternative to man-made [redacted]. Even after evidence called into question the validity of the Mixture data, and resulted in the return of a grant to a corporation and the resignation of a CoPI from a DOD award, Subject 1 and Subject 2 each continued to rely on the falsified and fabricated results to request and obtain additional support from NSF.

Degree of Intent

Subject 1. The evidence supports finding that Subject 1 acted purposefully throughout the alleged falsification and fabrication of his work with Compounds 1 through 4. Subject 1 was the hands-on experimentalist who collected the initial data and purportedly isolated the compounds as natural products. In addition to the pattern demonstrated by the initial falsification and fabrication for those compounds, Subject 1's perpetuation of the falsification and fabrication in later publications exacerbates his degree of intent. Furthermore, Subject 1 admitted to knowing falsification of the experimental conditions with respect to the use of pure Compound 2 in concert with Subject 2. While Subject 2's mentorship style and general demeanor created an atmosphere conducive to Subject 1's actions, it is insufficient to mitigate Subject 1's intent over the range of falsification and fabrication described above.

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[175] 45 C.F.R. 689.3(b).
[176] [redacted]
[177] Tab 32 at 228.
[178] Tab 34 at 278.

Subject 2. With respect to Subject 2, his degree of intent evolved from recklessness to purposefulness over the course of his actions concerning the purported natural products isolations, particularly with respect to Compounds 1 and 2 and their biological activities. Although there is difficulty in assigning specific dates of his transition from reckless to knowing to purposeful, the inability of students to reproduce the extraction of Compounds 1 and 2 and his failure to report the irreproducibility in the literature or to funding sources supports finding a greater than reckless degree of intent sometime in 2005. Subject 2's request for guidance from University administrators regarding his concerns about possible misconduct in his lab does not significantly mitigate his degree of intent in the absence of his full disclosure to them. Furthermore, Subject 2's unsolicited admission to the Committee that the commercially available Mixture was used when pure Compound 2 was reported is a separable, distinct knowing act of falsification perpetuated through Award 2 and its supplement.

Pattern of Behavior

Subject 1's misconduct involving Compounds 1 through 4 constitutes a broad pattern of falsification and fabrication. The Committee noted "additional suspected data" involving numerous additional compounds based on the correlation between purchase records and "extraordinary sample purity" leading it to question the data in two additional articles (Article 5 and Article 2).[179] Subject 2 corrected Article 5 in 2009 with Article 28[180] citing an inability "to find the experimental data that document the actual isolation of" ten compounds reported as exudates isolated from Plant 4.[181] Similarly Subject 2 retracted Article 2 via Article 30[182] citing an inability "to find written experimental data which documented the actual isolation of the purported" exudates (two additional compounds) from Plant 5.[183] The Committee did not extend its investigation to include a full investigation of the reported isolation of these compounds; however, the absence of supporting data, the correlation with purchasing records, and the similar methodology provide sufficient cause for concern about the existence of a broader pattern of conduct consistent with that observed for Compounds 1 through 4.

While Subject 2 continued to use "highly suspect data" and conclusions, he demonstrated a pattern of obfuscation in his communications to the DOD program officer and the series of published errata and corrections regarding the Mixture. In a November 2004 letter to the DOD program manager, Subject 1 marginalized the inter-lab controversy over the [redacted] application of the Mixture as a "recent discrepancy in our data" and contamination of a "particular batch" with [redacted].[184] The sequence of errata and corrections between 2004 and 2008 that Subject 2 submitted to the journals further obfuscated the "serious concerns about the data" [185] involving the extraction of the Mixture and the assumptions of distinct biological activities of Compounds 1 and 2.

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[179] Tab 34 at 271.
[180] Tab 28.
[181] [redacted]
[182] Tab 30.
[183] [redacted]
[184] Tab 40 at 1182 – 1186 and 1207 – 1209.
[185] Tab 34 at 272.

- Article 11, published in 2004 as a correction to Article 9, purports both to correct "preliminary [redacted] tests" at the heart of the [redacted] application dispute with Witness 8 and to report a recent finding that Compound 1 in addition to Compound 2 has [redacted] activity.[186] However, the new finding regarding Compound 1 has significant implications for the overall validity of Articles 7 and 8, which specifically focus on the activity of Compound 2 and the unreported use of the Mixture instead of Compound 2. Neither Article 7 nor 8 are corrected at this time with regard to this new finding. Subject 2 also does not correct Article 1 with respect to Compound 1's activity.

- Article 12 appeared shortly after Article 11 as an erratum to Article 8, but failed to identify the similar activity of Compound 1.[187] Again, this is particularly egregious given that Article 8 reports the use of Compound 2 when the Mixture was used.

- The [redacted] character of Compound 1 was not "corrected" with respect to Article 1 until Article 15 in 2005, which downplayed the high concentration reported for the Mixture using Solvent 1.[188]

- Article 7, which appeared in a highly prominent journal, was purportedly corrected in 2010 with Article 31. This correction stated "the authors have reconfirmed that [the Mixture] has the [redacted] activities indicated in [Article 7]" without noting the corrected [redacted] character of Compound 1 or the use of the commercial Mixture instead of isolated Compound 2.[189]

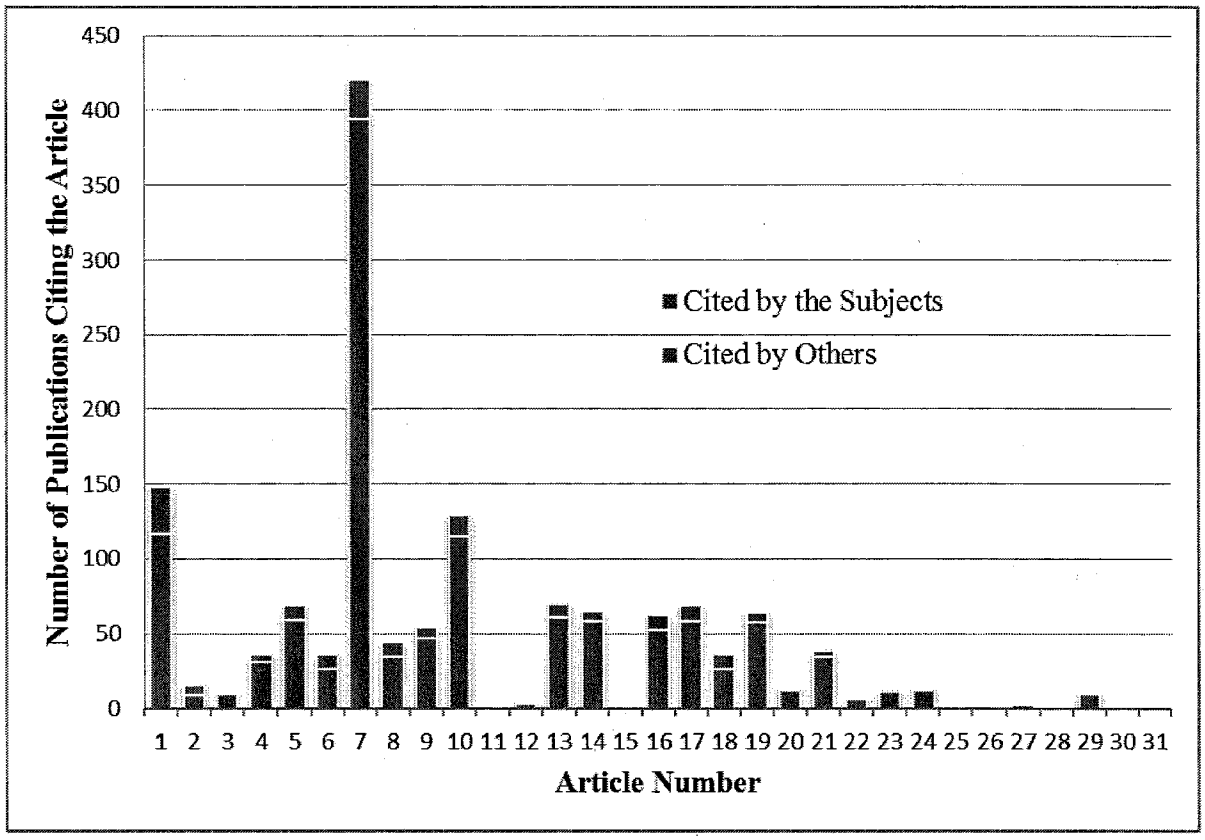
Thus, Subject 2 published a series of corrections, errata, and ultimately retractions that failed to address fully and accurately the problems with Article 1 and the subsequent work based on it. Subject 2's rush to "save-face" and failure to correct the literature in a comprehensive manner further perpetuated the falsification and fabrication.

Impact on the Research Record

Citation statistics for Articles 1 through 31 summarized in Figure 1 demonstrate the significant impact of the falsified and fabricated data on the published literature. In particular, Article 7, which appeared in a highly prominent journal and included the falsified use of pure Compound 2, was cited in 394 publications by authors other than Subject 1 or Subject 2. The next most cited articles are Article 1, which contained the initial data and conclusions for the extraction of the Mixture, and Article 10, which reported the first isolation of Compound 3 as a natural product.

[186] Tab 11.
[187] Tab 12.
[188] Tab 15.
[189] Tab 31.

Figure 1. Citation Statistics as of January 13, 2014[190]



However, the impact of the research misconduct is not limited to scholarly journals. Several press releases and news articles appeared in response to Article 1 and its progeny.[191] Article 1 is even cited in Wikipedia in the entry for Plant 1, where the bibliographic reference indicates that the paper has been retracted.[192]

Other Concerns

The Committee identified "several disconcerting findings" related to the "very tense laboratory setting focused on generating data that positively fit the prevailing hypothesis" and no standards or requirement for personnel to maintain notebooks to support their research. The Committee was unable to establish a specific connection to the allegations described in this report, but it recommended remedial action to improve laboratory practices in Subject 2's laboratory.

[190] Tab 58.C.
[191] Tab 66.
[192] Tab 69.

There is no indication that either subject had formal training in the responsible conduct of research. Subject 2 had his academic training (doctoral and postdoctoral) at U.S. research institutions.[193] In contrast, Subject 1's academic training prior to his employment with Subject 2 took place outside of the U.S.[194] Subject 2's failure to provide adequate mentoring to Subject 1 is a contributing factor to Subject 1's misconduct.

Both Subject 1 and Subject 2 enhanced their professional standing through the continued promotion of the falsified and fabricated research. Subject 1 is currently on the faculty of University 3 with the rank of assistant professor and has submitted numerous NSF proposals and received 7 NSF awards. Subject 1 is also the recipient of two NIH awards using American Recovery and Reinvestment Act of 2009 (ARRA) funds.[195] Subject 2 advanced through the ranks to full professor, which the Committee attributed in large part to the work in question. However, a separate committee reviewed the promotion and determined that a demotion was not warranted.

Recommendations

Subject 1. Based on the evidence, OIG recommends that NSF take the following action with respect to Subject 1:

- Send Subject 1 a letter of reprimand notifying him that NSF has made a finding of research misconduct.[196]
- Require Subject 1 certify to the Assistant Inspector General for Investigations (AIGI) his completion of a responsible conduct of research training program and provide documentation of the program's content within 1 year of NSF's finding.[197] The instruction should be in an interactive format (*e.g.*, an instructor-led course) and specifically include data fabrication and falsification.
- Terminate Subject 1's current NSF awards.[198]
- Require Subject 1 certify to the AIGI within 1 year of NSF's finding that he has notified each affected journal of the research misconduct finding and the appropriateness of the retractions already published for his work at University 1.[199]
- Debar Subject 1 for 5 years.[200]

Additionally for a period of 5 years immediately following the debarment period:

- Bar Subject 1 from participating as a peer reviewer, advisor, or consultant for NSF.[201]
- Require for each document (proposal, report, etc.) to which Subject 1 contributes for submission to NSF (directly or through his institution),
    - Subject 1 submit a contemporaneous certification to the AIGI that the document does not contain plagiarism, falsification, or fabrication.[202]

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[193] Tab 62 at 2009.
[194] Tab 61 at 1912-1913.
[195] Tab 67.
[196] A Group I action 45 C.F.R. 689.3(a)(1)(i).
[197] This action is similar to Group I actions 45 C.F.R. 689.3(a)(1).
[198] A Group III action 45 C.F.R. 689.3(a)(3)(iii).
[199] This action is similar to a Group II action 45 C.F.R. 689.3(a)(2)(iii).
[200] A Group III action 45 C.F.R. 689.3(a)(3)(iii).
[201] A Group III action 45 C.F.R. 689.3(a)(3)(ii).

  - Subject 1 submit a contemporaneous assurance from a responsible official of his employer to the AIGI that the document does not contain plagiarism, falsification, or fabrication.[203]
- Require Subject 1 submit to the AIGI for each NSF proposal a detailed data management plan including requirements for notebooks and data archiving to be adhered to during the course of any resulting award, and to provide annual certifications that this plan is being implemented.[204]
- Require Subject 2 submit to the AIGI for each NSF proposal a detailed mentoring plan describing the responsible conduct of research training each student, postdoctoral researcher, or other lab member funded by any resulting award will receive, and to provide annual certifications that this plan is being implemented.[205]

Subject 2. Based on the evidence, OIG recommends that NSF take the following action with respect to Subject 2:

- Send Subject 2 a letter of reprimand notifying him that NSF has made a finding of research misconduct.[206]
- Require Subject 2 certify to the AIGI his completion of a responsible conduct of research training program and provide documentation of the program's content within 1 year of NSF's finding.[207] The instruction should be in an interactive format (*e.g.*, an instructor-led course) and specifically include data fabrication and falsification.
- Require Subject 2 certify to the AIGI that all data for NSF-funded work published with Subject 1 has been reviewed and retractions made for all work unsupported by available data within 1 year of NSF's finding.[208]
- Debar Subject 2 for 3 years.[209]

Additionally for a period of 5 years immediately following the debarment period:

- Bar Subject 2 from participating as a peer reviewer, advisor, or consultant for NSF.[210]
- Require for each document (proposal, report, etc.) to which Subject 2 contributes for submission to NSF (directly or through his institution),
  - Subject 2 submit a contemporaneous certification to the AIGI that the document does not contain plagiarism, falsification, or fabrication.[211]
  - Subject 2 submit a contemporaneous assurance from a responsible official of his employer to the AIGI that the document does not contain plagiarism, falsification, or fabrication.[212]
- Require Subject 2 submit to the AIGI for each NSF proposal a detailed data management plan including requirements for notebooks and data archiving to be

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[202] This action is similar to 45 C.F.R. 689.3(a)(1)(iii).
[203] A Group I action 45 C.F.R. 689.3(a)(1)(iii).
[204] This action is similar to a Group II action 45 C.F.R. 689.3(a)(2)(ii).
[205] This action is similar to a Group II action 45 C.F.R. 689.3(a)(2)(ii).
[206] A Group I action 45 C.F.R. 689.3(a)(1)(i).
[207] This action is similar to Group I actions 45 C.F.R. 689.3(a)(1).
[208] This action is similar to a Group II action 45 C.F.R. 689.3(a)(2)(iii).
[209] A Group III action 45 C.F.R. 689.3(a)(3)(iii).
[210] A Group III action 45 C.F.R. 689.3(a)(3)(ii).
[211] This action is similar to 45 C.F.R. 689.3(a)(1)(iii).
[212] A Group I action 45 C.F.R. 689.3(a)(1)(iii).

adhered to during the course of any resulting award, and to provide annual certifications that this plan is being implemented. [213]

- Require Subject 2 submit to the AIGI for each NSF proposal a detailed mentoring plan describing the responsible conduct of research training each student, postdoctoral researcher, or other lab member funded by any resulting award will receive, and to provide annual certifications that this plan is being implemented.[214]

The Subjects' Responses to OIG's Draft Investigation Report

Each subject responded with comments through his respective legal counsel.[215] In general, each disagrees with the recommended finding of research misconduct and subsequent actions on different grounds. We have modified the report where necessary to clarify our assessment of the evidence and to reflect the final outcome of University 1's reassessment of Subject 2's promotion to full professor. We address the specific comments of each subject separately.

Subject 1's Response

Subject 1 asserted that we lack jurisdiction with respect to his involvement in Article 1. As we noted, Article 1 is not claimed as a work product in the final report for Award 1 despite the acknowledgement of the award in the article.[216] Our review of the financial records confirms that Subject 1 did not receive salary; however, salary support is not a prerequisite to establishing a nexus. The Committee identified a purchase order for the Mixture submitted by Subject 1 with the charge allocated to the university account corresponding to Award 1, supporting a nexus to the work in question.[217] Furthermore, Subject 1 submitted a copy of Article 1 with his proposal to continue the work with Compounds 1 and 2, enhancing the NSF nexus.[218] Thus, we find sufficient nexus for NSF jurisdiction over Subject 1 with respect to contents of Article 1.

Subject 1 also asserted that we have no jurisdiction over the proposal he submitted while at University 1 because NSF returned it to him without review. He noted he was ineligible for the program and consequently received no benefit from NSF as a result.[219] However, the research misconduct regulation applies to proposals submitted to NSF and is not limited to the subset that NSF funds.[220] Our investigation found: he certified the proposal as the authorized organizational representative (AOR);[221] his proposal focused on continuing the work in Article 1

[213] This action is similar to a Group II action 45 C.F.R. 689.3(a)(2)(ii).
[214] This action is similar to a Group II action 45 C.F.R. 689.3(a)(2)(ii).
[215] Tabs 71 and 72.
[216] Tab 71 at 2280.
[217] Tab 40 at 1229 – 1231.
[218] Tab 61 at 1900 – 1906.
[219] Tab 71 at 2286 – 2287.
[220] 45 C.F.R. 689.1(a) "*Research misconduct* means fabrication, falsification, or plagiarism **in proposing or performing research funded by NSF**, reviewing research proposals submitted to NSF, or in reporting research results funded by NSF." (Emphasis added) To the extent this definition is ambiguous regarding the status of unfunded or pending proposals, 45 C.F.R. 689.7 (regarding the handling of *pending* proposals and awards that are the subject of research misconduct allegations) resolves the ambiguity.
[221] Tab 61 at 1869.

for which he was the primary, hands-on researcher; and he included in the proposal a copy of Article 1 in support of the proposed work.[222] The submission of this proposal invokes our jurisdiction, provides sufficient nexus to the research reported in Article 1, and is also relevant to an analysis of his present responsibility in future proposals and the management of current awards.

Subject 1 objects to our characterization of his University 3 work as based on the research misconduct as "misleading."[223] Specifically he asserts, "in none of the grant submissions to NSF while [he] worked at University 3, did he ever directly rely upon the questioned work, research, conclusions or articles."[224] This contrasts directly with his verbal admission to the Committee that he is working with Compounds 1 and 2 at University 3. As indicated in the draft, we relied primarily on Subject 1's admission in his interview to characterize his work at University 3. A preliminary review of his NSF proposal portfolio corroborated that admission.

To address his comments, we reexamined his NSF proposal history and identified a series of proposal submissions that demonstrate an explicit intent to continue a parallel research path to the questioned work done at University 1 using a different invasive species.[225] These submissions were contemporaneous with his testimony to the investigation committee. With respect to his later NSF proposals, his departure from the [redacted] research focus coincides with University 1's final finding of research misconduct and the publication of the retractions of Article 1 and Article 7. Up until the University 1 findings, he included Article 7 as one of his relevant peer-reviewed publications on his NSF biographical sketch and cited it in the body of his proposals. His other proposals demonstrate an expansion of his research interests in closely related systems (*i.e.*, beneficial interactions instead of [redacted]) using experimental techniques similar to those he reported at University 1. Although Subject 1 asserts that he received no benefit from the misconduct and did not rely on it, his "expertise" in these techniques is derived from and supported by his publication record at University 1. University 1 has found that a significant portion of this work contains research misconduct.

Subject 1 commented that there is "no direct evidence" that he falsified the results for Compounds 1 through 4 and criticized the reliance on "circumstantial evidence."[226] The preponderance of evidence must support a recommendation for an NSF finding of research misconduct. The evidence *in its totality*, including the absence of a complete contemporaneous research record, is weighed with no requirement that a single evidentiary fact be dispositive in proving the allegations. In this case, we draw our conclusions from multiple pieces of corroborating evidence and testimony while accounting for the various possible alternative interpretations and witness' biases.

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[222] Tab 61 at 1900 – 1906.
[223] Tab 71 at 2286.
[224] Tab 71 at 2287.
[225] Tab 73 at 2483 – 2484. The series of declined proposals for examination of [redacted] includes: [redacted]
[226] Tab 71 at 2281.

Subject 1 asserts that a committee member had a conflict of interests that required his recusal from the Committee.[227] University 1 policy provided both subjects the opportunity to object to a selected committee member's participation at the outset of an investigation.[228] Neither subject did so in this case. Based on our review, the committee members had no conflicts that raised concern.[229]

Finally, Subject 1 asserted that the reported use of Compound 2 when the Mixture was actually used was honest error or difference of opinion.[230] This assertion is premised on his belief that he was told by Witness 5 that the plants were secreting the Mixture and that the reviewers of all subsequent publications knew that the racemic mixture was used in all subsequent bioassays.[231] However, this assertion does not address the specific falsification in the distinct allegation of reporting the use of pure Compound 2 when the Mixture was used. Regardless of the explanations he provides, Subject 1 and Subject 2 failed to report their actual experimental method. There is no evidence to suggest that the reviewers of Article 7 had any reason to know that the Mixture was used. The supplemental material describes work with Compound 2 distinctly separate from work with the Mixture and Compound 1.[232] Thus, even if the reviewers knew that the Mixture had been used instead of Compound 2, anyone attempting to replicate the experiment would not have had sufficient information.

Subject 2's Response

Subject 2's response to the draft report addressed few substantive points of the allegations and primarily criticized the investigation process and the timeliness of the report.[233] Subject 2 correctly pointed out that the Committee's recommendation for reconsideration of his promotion to full professor did not result in demotion. We modified the report to clarify the results of that review. We also updated our citation analysis and assessment of the impact on the literature in response to his comments.[234]

Subject 2 asserted that we did not consider the subsequent literature in our assessment of the work with Compounds 1 and 2.[235] However, as stated, subsequent results whether confirmatory or contradictory have limited value in our assessment. Our recommendations adequately reflect the possibility that Compounds 1 and 2 may to some degree have been present and may have behaved according to the novel hypothesis put forward. However, our concern remains whether Article 1 and its progeny accurately reflect the work actually done. As the committee noted, the body of work from Subject 1's laboratory on this topic has "confused" the

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[227] Tab 71 at 2281.
[228] Tab 33 at 251.
[229] Tabs 74 – 76.
[230] Tab 71 at 2286.
[231] Tab 71 at 2286.
[232] The Plant Material and Chemicals section specifically states [redacted] were obtained from Sigma (St. Louis, MO)" (Tab 7 at 43). The racemic mixture is properly written as [redacted] or [redacted]. In fact, the distinction is seen later in the experimental section: "To check the chirality of [redacted] was also run for CD spectroscopy" (Tab 7 at 47).
[233] Tab 72.
[234] Tab 77.
[235] Tab 72 at 2289, item 8.

literature warranting retraction and not correction. [236] It is the misrepresentation in the literature and in NSF proposals over an extended period of time that is the foundation of the recommended findings and actions in this case. That the literature may now be correcting itself does not negate the effects on the published research record.

With regard to the investigative process, Subject 2 asserted that the OIG investigation was neither timely nor conducted with appropriate regard for confidentiality.[237] There is no evidence to support intentional delays in the investigation, breaches of confidentiality, or other malfeasance. The absence of a complete contemporaneous research record in Subject 2's laboratory for the breadth of work in question contributed significantly to the complexity of the referred investigation, the time required to complete it, and the necessity for interviews with multiple witnesses.

In summary, the comments provided by Subject1 and Subject 2 did result in some minor changes to our report but did not alter our conclusions or recommended actions.

[236] Tab 34 at 278.
[237] Tab 72 at 2288 – 2289.

NATIONAL SCIENCE FOUNDATION
4201 WILSON BOULEVARD
ARLINGTON, VIRGINIA 22230

OFFICE OF THE
DEPUTY DIRECTOR

[redacted]

CERTIFIED MAIL –RETURN RECEIPT REQUESTED

[redacted]

Re: Notice of Proposed Debarment and Notice of Research Misconduct Determination

Dear [redacted]:

As a Professor in the [redacted] ("University"), you fabricated and falsified data that was used as the basis for at least eight journal articles published from 2002 through 2006 and that was used to support requests for funding from the National Science Foundation ("NSF"). These journal articles were also acknowledged by you in an NSF CAREER award as providing support for the research. This research misconduct is documented in the attached Investigative Report prepared by NSF's Office of Inspector General ("OIG").

In light of your misconduct, this letter serves as formal notice that NSF is proposing to debar you from directly or indirectly obtaining the benefits of Federal grants for three years. During your period of debarment, you will be precluded from receiving Federal financial and non-financial assistance and benefits under non-procurement Federal programs and activities. In addition, you will be prohibited from receiving any Federal contracts or approved subcontracts under the Federal Acquisition Regulations ("FAR"). Lastly, during your debarment period, you will be barred from having supervisory responsibility, primary management, substantive control over, or

critical influence on, a grant, contract, or cooperative agreement with any agency of the Executive Branch of the Federal Government.

In addition to your debarment, I am prohibiting you from serving as an NSF reviewer, advisor, or consultant to NSF for three years, until [redacted] 2017. Furthermore, for five years after the expiration of your debarment period, until [redacted] 2022, I am requiring that you submit certifications, and that a responsible official of your employer submit assurances, that any proposals or reports you submit to NSF do not contain plagiarized, falsified, or fabricated material. In addition, for five years after the expiration of your debarment period, until [redacted] 2022, you must submit to the Assistant Inspector General for Investigations ("AIGI") for each funded NSF proposal a detailed data management plan including requirements for notebooks and data archiving and certify annually that this plan is being implemented. You must also submit for five years after the expiration of your debarment period, until [redacted] 2022, to the AIGI for each funded NSF proposal a detailed mentoring plan describing responsible conduct in research training for each student, postdoc or other lab member funded by the proposal and certify annually that this plan is being implemented. Moreover, by [redacted] 2015, you must certify the completion of a comprehensive responsible conduct of research training course, and provide documentation of the program's content. You must also certify to the AIGI within one year, [redacted] 2015, that all data for NSF funded work you published with your former postdoc, [redacted], has been reviewed and retractions made for all work not supported by available data.

Research Misconduct

Under NSF's regulations, "research misconduct" is defined as "fabrication, falsification, or plagiarism in proposing or performing research funded by NSF ..." 45 CFR § 689.1(a). NSF defines "fabrication" as "making up data or results and recording or reporting them." 45 CFR § 689.1(a)(1). "Falsification" is defined as "manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research is not accurately represented in the research record" 45 CFR § 689.1(a)(2).

A finding of research misconduct requires that:

(1) There be a significant departure from accepted practices of the relevant research community; and
(2) The research misconduct be committed intentionally, or knowingly, or recklessly; and
(3) The allegation be proven by a preponderance of evidence.

45 CFR § 689.2(c)

Your admission of knowing falsification of the methodology used to isolate what is referenced in the OIG Investigative Report as "Compound 2" by reporting the use of a pure Compound 2 when

in fact you used a commercially available mixture, along with evidence from the OIG Investigative Report that you acted recklessly and later intentionally in your continued use of fabricated data, permits me to conclude that your actions meet the applicable definitions of fabrication and falsification, as set forth in NSF's regulations. This conclusion is further supported by the University's investigation and finding of research misconduct.

Pursuant to NSF's regulations, the Foundation must also determine whether to make a *finding* of research misconduct based on a preponderance of the evidence. 45 CFR § 689.2(c). After reviewing the OIG Investigative Report, the University finding of research misconduct, and your admission of data falsification, NSF has determined that, based on a preponderance of the evidence, your fabrication and falsification of data was committed recklessly and intentionally with regard to the perpetuation of the veracity of your former postdoc [redacted] data, and knowingly in falsifying methodology by reporting the use of an isolated Compound 2 when in fact you knew that a commercial mixture was used. These actions constituted a significant departure from accepted practices of the relevant research community. I am, therefore, issuing a finding of research misconduct against you.

NSF's regulations establish three categories of actions (Group I, II, and II) that can be taken in response to a finding of misconduct. 45 CFR § 689.3(a). Group I actions include issuing a letter of reprimand; conditioning awards on prior approval of particular activities from NSF; requiring that an institutional representative certify as to the accuracy of reports or certifications of compliance with particular requirements. 45 CFR § 689.3(a)(1). Group II actions include award suspension or restrictions on designated activities or expenditures; requiring special reviews of requests for funding; and requiring correction to the research record. 45 CFR § 689.3(a)(2). Group III actions include suspension or termination of awards; prohibitions on participation as NSF reviewers, advisors or consultants; and debarment or suspension from participation in NSF programs. 45 CFR § 689.3(a)(3).

In determining the severity of the sanction to impose for research misconduct, I have considered the seriousness of the misconduct; my determination that it was committed intentionally; the fact that the misconduct had an impact on the research record; and the fact that the misconduct was not an isolated incident, but part of a pattern spanning many years in which you continued to use data that you knew was highly suspect. I have also considered other relevant circumstances. *See* 45 CFR § 689.3(b).

Based on the foregoing, I am imposing the following actions on you:

- For five years after the expiration of your debarment period, until [redacted] 2022, I am requiring that you submit certifications that any proposals or reports you submit to NSF do not contain plagiarized, falsified, or fabricated material.

- For five years after the expiration of your debarment period, until [redacted] 2022, you are required to submit assurances by a responsible official of your employer that any proposals or reports you submit to NSF do not contain plagiarized, falsified, or fabricated material.

- From the date of this letter through [redacted] 2017, you are prohibited from serving as an NSF reviewer, advisor, or consultant.

- You are required to complete a comprehensive responsible conduct of research training course by [redacted] 2015, and provide documentation of the program's content. The instruction should be in an interactive format (e.g., an instructor-led course, workshop, etc.) and should include a discussion of data falsification and fabrication.

- For five years after the expiration of your debarment period, until [redacted] 2022, you must submit for each funded NSF proposal a detailed data management plan including requirements for notebooks and data archiving and certify annually that this plan is being implemented.

- For five years after the expiration of your debarment period, until [redacted] 2022, you must submit for each funded NSF proposal a detailed mentoring plan describing responsible conduct in research training for each student, postdoc or other lab member funded by the proposal and certify annually that this plan is being implemented.

- You must certify to the AIGI within one year, [redacted] 2015, that all data for NSF funded work you published with your former postdoc [redacted] has been reviewed and retractions made for all work not supported by available data.

All certifications, assurances, training documentation, and data management plans should be submitted in writing to NSF's Office of the Inspector General, Associate Inspector General for Investigations, 4201 Wilson Boulevard, Arlington, Virginia 22230.

Debarment

Regulatory Basis for Debarment

Pursuant to 2 CFR § 180.800, debarment may be imposed for:

(b) Violation of the terms of a public agreement or transaction so serious as to affect the integrity of the agency program, such as –

(1) A willful failure to perform in accordance with the terms of one or more public agreements or transactions;

...

(3) A willful violation of a statutory or regulatory provision or requirement applicable to a public agreement or transaction; or

(d) Any other cause of so serious or compelling a nature that it affects your present responsibility.

In any debarment action, the government must establish the cause for debarment by a preponderance of the evidence. 2 CFR § 180.850. In this case, you admitted to knowing falsification of the methodology used to isolate Compound 2 by reporting the use of a pure Compound 2 when in fact you used a commercially available mixture. As described in the OIG Investigative Report and the University investigation, you also acted recklessly and later intentionally in your continued use of fabricated data. Thus, your actions support a cause for debarment under 2 CFR §§ 180.800(b) and (d).

Length of Debarment

Debarment must be for a period commensurate with the seriousness of the causes upon which an individual's debarment is based. 2 CFR § 180.865. Having considered the seriousness of your actions, as well as the relevant aggravating and mitigating factors set forth in 2 CFR § 180.860, we are proposing your debarment for three years. In a [redacted] letter you were notified that your current award [redacted] was immediately suspended, that award will be terminated if this proposed debarment becomes final. 2 CFR § 180.760.

Appeal Procedures for finding of Research Misconduct and Procedures Governing Proposed Debarment

Appeal Procedures for Finding of Research Misconduct

Under NSF's regulations, you have 30 days after receipt of this letter to submit an appeal of this finding, in writing, to the Director of the Foundation. 45 CFR § 689.10(a). Any appeal should be addressed to the Director at the National Science Foundation, 4201 Wilson Boulevard, Arlington, Virginia 22230. If we do not receive your appeal within the 30-day period, the decision on the finding of research misconduct will become final. For your information, we are attaching a copy of the applicable regulations.

Procedures Governing Proposed Debarment

The provisions of 2 CFR Sections 180.800 through 180.885 govern debarment procedures and decision-making. Under our regulations, you have 30 days after receipt of this notice to submit,

in person or in writing, or through a representative, information and argument in opposition to this debarment. 2 CFR § 180.820. Comment submitted within the 30-day period will receive full consideration and may lead to a revision of the recommended disposition. If NSF does not receive a response to this notice within the 30-day period, this debarment will become final. Any response should be addressed to Lawrence Rudolph, General Counsel, National Science Foundation, Office of the General Counsel, 4201 Wilson Boulevard, Room 1265, Arlington, Virginia 22230. For your information, I am attaching a copy of the Foundation's regulations on non-procurement debarment and FAR Subpart 9.4.

Should you have any questions about the foregoing, please contact [redacted], Assistant General Counsel, at (703) 292-[redacted].

Sincerely,

Cora B. Marrett

Cora B. Marrett
Deputy Director

Enclosures:
Investigative Report
Nonprocurement Debarment Regulations
FAR Regulations
45 CFR Part 689

NATIONAL SCIENCE FOUNDATION
4201 WILSON BOULEVARD
ARLINGTON, VIRGINIA 22230

[redacted]

OFFICE OF THE
DIRECTOR

CERTIFIED MAIL--RETURN RECEIPT REQUESTED

[redacted]

Re: Notice of Debarment

Dear [redacted]:

On [redacted], the National Science Foundation (NSF) issued a Notice of Proposed Debarment and Notice of Research Misconduct Determination with regard to your fabrication and falsification of data that was used as the basis for at least eight journal articles published from 2002 through 2006, and was used to support requests for funding from the National Science Foundation (NSF). Consistent with the OIG recommendation contained in its report dated February 27, 2014, which was provided to you, NSF recommended that you be debarred for a period of five years.

On August 12, 2014, you presented written and oral arguments and asked that NSF reduce your debarment time. We considered your arguments carefully, in particular, the fact that you entered into a comprehensive agreement with [redacted] to correct lab practices, record keeping, and data collection, with direct oversight from the [redacted]. This agreement further ensured ongoing training by you and mentoring of you and members of your lab. In light of these extensive, robust measures, NSF will reduce your debarment to a period of one year from the date of this letter.

Debarment precludes you from receiving federal financial and non-financial assistance and benefits under non-procurement federal programs and activities unless an agency head or authorized designee makes a determination to grant an exception in accordance with 2 CFR 180.135. Non-procurement transactions include grants, cooperative agreements, scholarships,

fellowships, contracts of assistance, loans, loan guarantees, subsidies, insurance, payments for specified use, and donation agreements.

In addition, you are prohibited from receiving federal contracts or approved subcontracts under the Federal Acquisition Regulations at 48 CFR subpart 9.4 for the period of this debarment. 2 CFR 180.925. During the debarment period, you may not have supervisory responsibility, primary management, substantive control over, or critical influence on, a grant, contract, or cooperative agreement with any agency of the Executive Branch of the Federal Government. For your information, we are attaching a copy of the Foundation's regulations on non-procurement debarment and FAR Subpart 9.4.

Please note that, in the Notice, NSF also took the following actions against you, which continue to remain in effect:

- For five years from the end of your debarment period, you are required to submit certifications that any proposals or reports you submit to NSF do not contain plagiarized, falsified, or fabricated material;

- For five years from the end of your debarment period, you are required to submit assurances by a responsible official of your employer that any proposals or reports you submit to NSF do not contain plagiarized, falsified, or fabricated material;

- For five years from the end of your debarment period, you are prohibited from serving as an NSF reviewer, advisor or consultant;

- You are required to complete a comprehensive responsible conduct of research training course in one year and provide documentation of the program's content. The instruction should be in an interactive format (e.g., instructor led course, workshop, etc.) and should include a discussion of data fabrication; and

- You must certify to the AIGI within one year that all data for NSF funded work you published has been reviewed and retractions made for all work not supported by available data.

Because you have entered into a detailed agreement with [redacted] with regard to data management and quality and laboratory training and mentoring, NSF will not require you to submit data management or mentoring plans.

All certifications and assurances should be submitted in writing to the following e-mail address: sanctions@nsf.gov.

Should you have any questions about the foregoing, please contact [redacted], Deputy General Counsel, at (703) 292-8060.

Sincerely,

Richard O Buck

Dr. Richard O. Buckius
Chief Operating Officer

Enclosures:
Nonprocurement Debarment Regulations
FAR Regulations

NATIONAL SCIENCE FOUNDATION
4201 WILSON BOULEVARD
ARLINGTON, VIRGINIA 22230

OFFICE OF THE
DEPUTY DIRECTOR

[redacted]

CERTIFIED MAIL –RETURN RECEIPT REQUESTED

[redacted]

Re: ***Notice of Proposed Debarment and Notice of Research Misconduct Determination***

Dear [redacted]:

As a Postdoc in the [redacted] ("University"), you fabricated and falsified data that was used as the basis for at least eight journal articles published from 2002 through 2006 and that was used to support a request for funding from the National Science Foundation ("NSF"). This research misconduct is documented in the attached Investigative Report prepared by NSF's Office of Inspector General ("OIG").

In light of your misconduct, this letter serves as formal notice that NSF is proposing to debar you from directly or indirectly obtaining the benefits of Federal grants for five years. During your period of debarment, you will be precluded from receiving Federal financial and non-financial assistance and benefits under non-procurement Federal programs and activities. In addition, you will be prohibited from receiving any Federal contracts or approved subcontracts under the Federal Acquisition Regulations ("FAR"). Lastly, during your debarment period, you will be barred from having supervisory responsibility, primary management, substantive control over, or critical influence on, a grant, contract, or cooperative agreement with any agency of the Executive Branch of the Federal Government.

In addition to your debarment, I am prohibiting you from serving as an NSF reviewer, advisor, or consultant to NSF for five years, until [redacted] 2019. Furthermore, for five years after the expiration of your debarment period, until [redacted] 2024, I am requiring that you submit certifications, and that a responsible official of your employer submit assurances, that any proposals or reports you submit to NSF do not contain plagiarized, falsified, or fabricated material. In addition, for five years after the expiration of your debarment period, until [redacted] 2024, you must submit to the Assistant Inspector General for Investigations ("AIGI") for each funded NSF proposal a detailed data management plan including requirements for notebooks and data archiving and certify annually that this plan is being implemented. You must also submit for five years after the expiration of your debarment period, until [redacted], 2024, to the AIGI for each funded NSF proposal a detailed mentoring plan describing responsible conduct in research training for each student, postdoc or other lab member funded by the proposal and certify annually that this plan is being implemented. Moreover, by [redacted], 2015, you must certify the completion of a comprehensive responsible conduct of research training course, and provide documentation of the program's content. You must also certify to the AIGI within one year, [redacted] 2015, that all data for NSF funded work you published with your former colleague, [redacted], has been reviewed and retractions made for all work not supported by available data.

Research Misconduct

Under NSF's regulations, "research misconduct" is defined as "fabrication, falsification, or plagiarism in proposing or performing research funded by NSF ..." 45 CFR § 689.1(a). NSF defines "fabrication" as "making up data or results and recording or reporting them." 45 CFR § 689.1(a)(1). "Falsification" is defined as "manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research is not accurately represented in the research record" 45 CFR § 689.1(a)(2).

A finding of research misconduct requires that:

(1) There be a significant departure from accepted practices of the relevant research community; and
(2) The research misconduct be committed intentionally, or knowingly, or recklessly; and
(3) The allegation be proven by a preponderance of evidence.

45 CFR § 689.2(c)

You admitted to the knowing falsification of the methodology used to isolate what is referenced in the OIG Investigative Report as "Compound 2" by reporting the use of a pure Compound 2 when in fact you used a commercially available mixture. The evidence also shows that you intentionally fabricated and falsified data, results, and conclusions involving your work with what are referenced in the OIG Investigative Report as "Compounds 1-4" and purposefully

continued to use the fabricated data, results, and conclusions in a request for NSF postdoctoral support, professional presentations, and funding proposals. Your admission along with evidence from the OIG Investigative Report that you acted intentionally in your continued use of the fabricated data permits me to conclude that your actions meet the applicable definitions of fabrication and falsification, as set forth in NSF's regulations. This conclusion is further supported by the University's investigation and finding of research misconduct.

Pursuant to NSF's regulations, the Foundation must also determine whether to make a *finding* of research misconduct based on a preponderance of the evidence. 45 CFR § 689.2(c). After reviewing the OIG Investigative Report and considering the University finding of research misconduct, and your admission of data falsification, NSF has determined that, based on a preponderance of the evidence, your fabrication and falsification of data, results, and conclusions was committed intentionally with respect to Compounds 1-4, and knowingly in falsifying the methodology by reporting the use of an isolated Compound 2 when in fact you knew that a commercial mixture was used. These actions constituted a significant departure from accepted practices of the relevant research community. I am, therefore, issuing a finding of research misconduct against you.

NSF's regulations establish three categories of actions (Group I, II, and III) that can be taken in response to a finding of misconduct. 45 CFR § 689.3(a). Group I actions include issuing a letter of reprimand; conditioning awards on prior approval of particular activities from NSF; requiring that an institutional representative certify as to the accuracy of reports or certifications of compliance with particular requirements. 45 CFR § 689.3(a)(1). Group II actions include award suspension or restrictions on designated activities or expenditures; requiring special reviews of requests for funding; and requiring correction to the research record. 45 CFR § 689.3(a)(2). Group III actions include suspension or termination of awards; prohibitions on participation as NSF reviewers, advisors or consultants; and debarment or suspension from participation in NSF programs. 45 CFR § 689.3(a)(3).

In determining the severity of the sanction to impose for research misconduct, I have considered the seriousness of the misconduct; my determination that it was committed intentionally; the fact that the misconduct had an impact on the research record; and the fact that the misconduct was not an isolated incident, but part of a pattern spanning many years in which you continued to use data that you knew was highly suspect. I have also considered other relevant circumstances. *See* 45 CFR § 689.3(b).

Based on the foregoing, I am imposing the following actions on you:

- For five years after the expiration of your debarment period, until [redacted], 2024, I am requiring that you submit certifications that any proposals or reports you submit to NSF do not contain plagiarized, falsified, or fabricated material.

- For five years after the expiration of your debarment period, until [redacted] 2024, you are required to submit assurances by a responsible official of your employer that any proposals or reports you submit to NSF do not contain plagiarized, falsified, or fabricated material.

- From the date of this letter through [redacted], 2019, you are prohibited from serving as an NSF reviewer, advisor, or consultant.

- You are required to complete a comprehensive responsible conduct of research training course by [redacted] 2015, and provide documentation of the program's content. The instruction should be in an interactive format (e.g., an instructor-led course, workshop, etc.) and should include a discussion of data falsification and fabrication.

- For five years after the expiration of your debarment period, until [redacted] 2024, you must submit for each funded NSF proposal a detailed data management plan including requirements for notebooks and data archiving and certify annually that this plan is being implemented.

- For five years after the expiration of your debarment period, until [redacted] 2024, you must submit for each funded NSF proposal a detailed mentoring plan describing responsible conduct in research training for each student, postdoc or other lab member funded by the proposal and certify annually that this plan is being implemented.

- You must certify to the AIGI within one year, [redacted], 2015, that all data for NSF funded work you published with your former colleague [redacted], has been reviewed and retractions made for all work not supported by available data.

All certifications, assurances, training documentation, and data management plans should be submitted in writing to NSF's Office of the Inspector General, Associate Inspector General for Investigations, 4201 Wilson Boulevard, Arlington, Virginia 22230.

Debarment

Regulatory Basis for Debarment

Pursuant to 2 CFR § 180.800, debarment may be imposed for:

(b) Violation of the terms of a public agreement or transaction so serious as to affect the integrity of the agency program, such as –

(1) A willful failure to perform in accordance with the terms of one or more public agreements or transactions;

...

(3) A willful violation of a statutory or regulatory provision or requirement applicable to a public agreement or transaction; or

(d) Any other cause of so serious or compelling a nature that it affects your present responsibility.

In any debarment action, the government must establish the cause for debarment by a preponderance of the evidence. 2 CFR § 180.850. In this case, you admitted to knowing falsification of the methodology used to isolate Compound 2 by reporting the use of a pure Compound 2 when in fact you used a commercially available mixture. As described in the OIG Investigative Report and the University investigation, you also acted intentionally in your continued use of falsified and fabricated data. Thus, your actions support a cause for debarment under 2 CFR §§ 180.800(b) and (d).

Length of Debarment

Debarment must be for a period commensurate with the seriousness of the causes upon which an individual's debarment is based. 2 CFR § 180.865. Having considered the seriousness of your actions, as well as the relevant aggravating and mitigating factors set forth in 2 CFR § 180.860, we are proposing your debarment for five years. In a [redacted] letter you were notified that your current award [redacted] was immediately suspended, that award will be terminated if this proposed debarment becomes final. 2 CFR § 180.760.

Appeal Procedures for finding of Research Misconduct and Procedures Governing Proposed Debarment

Appeal Procedures for Finding of Research Misconduct

Under NSF's regulations, you have 30 days after receipt of this letter to submit an appeal of this finding, in writing, to the Director of the Foundation. 45 CFR § 689.10(a). Any appeal should be addressed to the Director at the National Science Foundation, 4201 Wilson Boulevard, Arlington, Virginia 22230. If we do not receive your appeal within the 30-day period, the decision on the finding of research misconduct will become final. For your information, we are attaching a copy of the applicable regulations.

Procedures Governing Proposed Debarment

The provisions of 2 CFR Sections 180.800 through 180.885 govern debarment procedures and decision-making. Under our regulations, you have 30 days after receipt of this notice to submit, in person or in writing, or through a representative, information and argument in opposition to this debarment. 2 CFR § 180.820. Comment submitted within the 30-day period will receive full consideration and may lead to a revision of the recommended disposition. If NSF does not receive a response to this notice within the 30-day period, this debarment will become final. Any response should be addressed to Lawrence Rudolph, General Counsel, National Science Foundation, Office of the General Counsel, 4201 Wilson Boulevard, Room 1265, Arlington, Virginia 22230. For your information, I am attaching a copy of the Foundation's regulations on non-procurement debarment and FAR Subpart 9.4.

Should you have any questions about the foregoing, please contact [redacted], Assistant General Counsel, at (703) 292-[redacted]

Sincerely,

Cora B. Marrett

Cora B. Marrett
Deputy Director

Enclosures:
Investigative Report
Nonprocurement Debarment Regulations
FAR Regulations
45 CFR Part 689

NATIONAL SCIENCE FOUNDATION
4201 WILSON BOULEVARD
ARLINGTON, VIRGINIA 22230

[redacted]

OFFICE OF THE
DIRECTOR

CERTIFIED MAIL--RETURN RECEIPT REQUESTED

[redacted]

Re: Final Research Misconduct Determination and Notice of Debarment

Dear [redacted]:

On [redacted] we issued a Notice of Proposed Debarment and Notice of Research Misconduct Determination (Notice) based on your fabrication and falsification of data while you were a researcher at [redacted]. On December 18, 2014, you presented written and oral arguments on appeal of the research misconduct finding and in opposition to the proposed debarment. We considered your arguments carefully, and we conducted a detailed review of the entirety of the record in light of the information you provided.

The preponderance of the evidence in the record supports a finding of research misconduct, and therefore our research misconduct determination for fabrication and falsification by you is sustained and is final. However, considering that your misconduct was not intentional and you did not have primary authority for the [redacted] laboratory where the events occurred, we will impose a debarment of one year, as opposed to the proposed five years, from the date of this letter.

Debarment precludes you from receiving federal financial and non-financial assistance and benefits under non-procurement federal programs and activities unless an agency head or authorized designee makes a determination to grant an exception in accordance with 2 CFR 180.135. Non-procurement transactions include grants, cooperative agreements, scholarships, fellowships, contracts of assistance, loans, loan guarantees, subsidies, insurance, payments for specified use, and donation agreements.

In addition, you are prohibited from receiving federal contracts or approved subcontracts under the Federal Acquisition Regulations at 48 CFR subpart 9.4 for the period of this debarment. 2 CFR 180.925. During the debarment period, you may not have supervisory responsibility,

Primary management, substantive control over, or critical influence on, a grant, contract, or cooperative agreement with any agency of the Executive Branch of the Federal Government.

In sum, as a final matter, NSF is taking the following actions against you:

- You are debarred for a period of one year from the date of this letter;
- For five years from the end of your debarment period, you are required to submit certifications that any proposals or reports you submit to NSF do not contain plagiarized, falsified, or fabricated material;
- For five years from the end of your debarment period, you are required to submit assurances by a responsible official of your employer that any proposals or reports you submit to NSF do not contain plagiarized, falsified, or fabricated material;
- For five years from the end of your debarment period, you are prohibited from serving as an NSF reviewer, advisor or consultant; and
- You are required to complete a comprehensive responsible conduct of research training course within one year and provide documentation of the program's content. The instruction should be in an interactive format (e.g., instructor led course, workshop, etc.) and should include a discussion of data fabrication.

All certifications and assurances should be submitted in writing to the following e-mail address: sanctions@nsf.gov.

Should you have any questions about the foregoing, please contact [redacted], Deputy General Counsel, at (703) 292-8060.

Sincerely,

Richard O. Buckius
Chief Operating Officer

cc: [redacted], Esq.