July 25, 2023
Assessment Report

I. Background

On June 15, 2023, Dr. Gian-Stefano Brigidi ("Respondent"), an Assistant Professor in the Department of Neurobiology at the University of Utah ("UofU"), contacted the [redacted] ("Complainant"), to admit to several acts of research misconduct. The Complainant immediately notified the UofU Associate Vice President for Research Integrity & Compliance ("AVPRIC") and Research Integrity Officer ("RIO"). On June 16, the Complainant and Respondent met with the AVPRIC and RIO. During the June 16th Meeting, the Respondent provided the following narration:

> Between 2015-2020, while as a Postdoctoral Fellow at the University of California San Diego ("UCSD"), the Respondent committed multiple acts of falsification and fabrication associated with research performed in the lab of [redacted] at UCSD. The falsified and fabricated data were performed under a research project funded in part by the National Institutes of Health ("NIH") and resulted in a 2019 publication to *Cell*, titled: "*Genomic decoding of neuronal depolarization by stimulus specific NPAS4 heterodimers*" (full citation provided below).
>
> After completing his postdoctoral fellowship, the Respondent accepted a faculty position as an Assistant Professor in the Department of Neurobiology at the UofU. While at the UofU, the Respondent applied for and received an NIH Director's New Innovator Award ("DP2") grant. The NIH DP2 grant relied upon the Respondent's experience and work at UCSD, the 2019 *Cell* publication, and information provided in the grant application. The DP2 grant application also included further data falsification and fabrication.
>
> In May 2023, the Respondent was contacted by colleagues from his former lab at UCSD with questions and concerns regarding data/images presented in the 2019 *Cell* publication. In an attempt to conceal his misconduct, the Respondent provided multiple raw, unedited images to UCSD that he represented as the "original" images used for the publication. However, the UCSD colleagues reviewed the metadata for the images, which contained date and location information clearly indicating that the images provided by the Respondent were not the original images. When the UCSD colleagues questioned the Respondent concerning the discrepancy, the Respondent confessed his misconduct to [redacted] at UCSD. The Respondent also contact [redacted] at the UofU to inform her of his admission.

II. Admissions

The admissions of research misconduct primarily apply to the following publication in *Cell*:

Brigidi GS, Hayes MGB, Delos Santos NP, Hartzell AL, Texari L, Lin P-A, Bartlett A, Ecker JR, Benner C, Heinz S, Bloodgood BL (2019). Genomic decoding of neuronal depolarization by stimulus specific NPAS4 heterodimers. ***Cell*** 179 :373-391. *PMID*: 31585079. *PMCID*: PMC6800120.

The *Cell* publication contains multiple acts of falsification and fabricatation, which are enumerated and described in individual detail in "Supplement A: S.Brigidi_RM Admission." The UofU acknowledges that because the research misconduct associated with the *Cell* Publication occurred at UCSD, UCSD has jurisdiction over reviewing acts of research misconduct that are admitted to have occurred there.

However, because the Respondent included falsified and fabricated data related to the *Cell* publication in the NIH DP2 grant submission from the UofU, jurisdiction over acts of research misconduct in the NIH grant submission is affirmed at the UofU. Additionally, the UofU asserts jurisdiction over falsification related to sending misrepresented images to UCSD in an attempt to obscure the research record.

III. PHS Support

The *Cell* publication was supported by two awards from the NIH:

- National Institute of Mental Health (NIMH) Award No. F32MH110141, and
- National Library of Medicine (NLM) Training Grant No. T15LM011271.

The NIH DP2 Grant Application was supported by Award No. 1DP2NS127276-01.

IV. Institutional Assessment:

Upon receiveing the Respondent's verbal admissions, the UofU contacted the federal Office of Research Integrity (ORI) to determine how best to proceed with admissions and to obtain guidance on collaborating with UCSD.

On June 23, 2023, in conversation with Dr. Alex Runko, Director of the ORI's Division of Investigative Oversight (DIO), the UofU AVPRIC and RIO were instructed to:

1. obtain a written and signed admission of research misconduct from the Respondent and complete an initial assessment, which pursuant to 42 CFR § 93.316 may replace the Inquiry and Investigation stages because of the Respondent's admission, and
2. contact the UCSD RIO to discuss collaborating and coordinating the misconduct reviews to ensure efficiency, accuracy, and outcome agreement.

A. Sequestration Process:

On June 20, 2023, the AVPRIC and a representative from the UofU Information Security Office met with [redacted] and the Respondent to sequester the following items from the Respondent and his lab (the "Brigidi Lab"):

1. Respondent's UofU department-issued laptop
2. Brigidi Lab Linux server
3. Brigidi Lab Synology drive server
4. Brigidi Lab PC
5. Brigidi Lab physiology rackmount microscope PC
6. Brigidi Lab NVME drive for physiology microscope PC
7. Respondent's UofU Outlook email archive

The Respondent was present for the sequestration activity and cooperative in facilitating the identification and collection/copying of indicated items. Additionally, throughout the assessment process detailed below, the Respondent has been responsive to requests to locate and identify data and images, and to explain their relationship to data and figures in the *Cell* publication and NIH DP2 Grant application.

B. Admission and Assessment:

1. Timeline:
   i. On 6/16/2023, the UofU AVPRIC, RIO, and a representative of the University's Office of General Counsel ("OGC") met with the Respondent and [redacted] to receive the initial admission of research misconduct, as described above in section I.
   ii. On 6/20/2023, the AVPRIC and a representative of the Information Technology Office met with the Respondent and [redacted] to sequester pertinent items, as described above in section IV.A.
   iii. On 6/23/2023, the AVPRIC, RIO, and OGC met with Dr. Alex Runko of the DIO to seek guidance, as described above under section IV.
   iv. On 6/29/2023, the AVPRIC, RIO and OGC met with [redacted] a subject matter expert in the Department of Neurobiology, to request his assistance in the assessment of the Respondent's admission and sequestered evidence. After confirming confidentiality and absence of any conflict of interest, [redacted] was charged with reviewing the Respondent's admission and corresponding data, and to provide his opinion re: the admission completeness and accuracy.
   v. On 7/6/2023, the AVPRIC, RIO, Forensics Illustrator for the AVPRIC Office ("Forensics Illustrator"), and OGC met with the Respondent to obtain a complete accounting of all research misconduct performed by the Respondent. For each instance of misconduct, the applicable data/figure was identified and it was determined:
      a. if the action was falsification, fabrication, or plagiarism,
      b. if the action was done intentionally/knowingly/recklessly,
      c. how the misconduct was performed,
      d. where the misconduct has been included (i.e., publication, grant application, poster, presentation, etc.), and
      e. who the responsible party was/parties were.

A completed summary of the Respondent's admission is included as "Supplement A: S.Brigidi_RM Admission".

vi. On 7/10/2023, the AVPRIC and RIO met with the Respondent to identify the original raw data and images associated with figures and panels that had been identified as falsified and/or fabricated during the 7/6/2023 meeting (see item IV.B.1.v. above). The Respondent also identified the corresponding post-misconduct versions of each figure/panel.

vii. On 7/12/2023, the RIO and Forensics Illustrator met with the Respondent to review supplementary figures from the 2019 *Cell* publication. Additional admissions were recorded on "Supplement A: S.Brigidi_RM Admission." The original raw images for all figures included in the *Cell* publication and NIH DP2 Grant application were also identified for review by the Forensics Illustrator.

viii. On 7/14/2023, the RIO asked the Forensics Illustrator to perform a comparative analysis of all original and final images used within the NIH DP2 Grant application that the Respondent claimed to be accurate. The purpose of the analysis was to confirm that no additional, undisclosed research misconduct was performed. The Forensics Illustrator was also asked to perform the same analysis for a random selection of images from the *Cell* publication.

2. Evidence Sequestered: see section IV.A., above.
3. Evidence Reviewed: The evidence reviewed includes:
   i. the verbal and written admissions from the Respondent,
   ii. the original data and images from all figures within the Cell publication and NIH DP2 Grant application, and
   iii. the post-falsification/fabrication versions of all figures and data identified as containing research misconduct.
4. Policies and procedures:
   i. University Policy 7-001: Research Misconduct was used to guide and define procedures and process.
   ii. The Federal Office of Research Integrity, 42 CFR Part 93 §103, and the University Policy 7-001: Research Misconduct was used to provide definitions for "research misconduct," "falsification," and "research record."
      a. "Research misconduct means fabrication, falsification, and/or plagiarism in proposing, performing, or reviewing research, or in reporting research results… Research misconduct does not include honest error or differences of opinion."
      b. "Fabrication is making up results and recording or reporting them."
      c. "Falsification is 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."
   iii. 42 CFR § 93.316 was used to inform the post-admission process and procedures.

C. Collaboration and Coordination with UCSD:
On June 19, 2023, the UofU AVPRIC contacted the UCSD RIO, Angela McMahill, to propose collaborating and coordinating misconduct reviews. On July 10, 2023, Diana Kim, Associate Director of Research Compliance & Integrity at UCSD, met with the UofU AVPRIC, RIO, and OGC by Zoom to discuss.

During the July 10th call, Diana Kim indicated that UCSD policies prohibit any acknowledgment or discussion regarding research misconduct cases with outside entities. As a result, coordination and collaboration between UCSD and the UofU have not been possible.

Please note that in addition to the PHS Support identified above in section III, the work supporting the *Cell* Publication was also supported by a National Science Foundation (NSF), specifically grant award no.: 2015215385. As such, notification to the NSF Office of Inspector General of the research misconduct that occurred in the *Cell* publication is required. However, such activity falls under the purview and jurisdiction of UCSD.

V. Analysis

A. **Admission: Falsification and fabrication of data and figures in the 2019 Cell publication ("*Appendix A*").**

1. Background: The Respondent has admitted to acts of falsification and/or fabrication in Figures 1, 2, 3, 4 and Supplemental Figures 2, 3, and 6 of the 2019 *Cell* publication. The Respondent's complete and detailed accounting of all acts of misconduct related to the *Cell* publication are provided in "Supplement A: S.Brigidi_RM Admission," item 1.
2. Analysis:
   i. [redacted] reviewed the *Cell* publication with respect to the admission and concluded that "the admission statement is generally accurate." However, [redacted] expressed several concerns:
      - A lack of original raw images for all figures and panels in which no misconduct occured (i.e., images claimed to be "accurate")
      - Absence of Supplemental Figures in the Respondent's admission
      - Difficulty distinguishing between "falsification" vs. "fabrication"
      - Feeling that the significance/impact of the research misconduct is downplayed in the admission

      On July 12, 2023, the Forensics Illustrator and the RIO met with the Respondent to resolve the first two concerns. The Forensics Illustrator and the RIO were successful in obtaining the original images for all figures and panels and in reviewing the Supplemental Figures with the Respondent. As discussed more fully below, the Forensics Illustrator was satisfied with the Respondent's representations concerning the other images in the *Cell* publication.

Regarding the third concern: [redacted] felt that the Respondent's use of image data obtained from an unrelated tissue sample constitutes fabrication, not falsification. However, by definition, the act of manipulating real research data – albeit from an unrelated tissue sample – such that it no longer accurately reflects the research record, is falsification.

Regarding the fourth concern: the respondent's admission statement indicates that falsification was done "to make the images cleaner and more compelling." [redacted] expressed his opinion that the impact of the Respondent's misconduct goes beyond simply enhancing the research results and consitutes fabricated findings that do not exist. However, the Respondent's admission also states that fabrication was performed to "generate results consistent with the core findings reported in the publication." The Respondent's admission appears to acknowledge that his misconduct was done to fabricate, or generate results.

ii. The original images and data from a random selection of figures and panels were reviewed by the Forensics Illustrator, including figures/panels that were reported by the Respondent to be accurate. To confirm that images claimed to be accurate did not include unreported misconduct, the original images were processed using acceptable and scientifically appropriate techniques in order to generate the published image files. Overall, the Forensics Illustrator was able to use the raw images to re-generate the published images with close approximation. It should be noted that in some instances she had to significantly modify the levels, brightness, and contrast in order to generate the published images.

B. **Admission: Falsification and fabrication of data and figures in the NIH DP2 Grant application ("*Appendix F*").**

1. Background: The Respondent has admitted to acts of falsification in Figures 4, 5, and 6 of his NIH DP2 grant application. The Respondent's complete and detailed accounting of all acts of falsification related to the DP2 Grant are provided in "Supplement A: S.Brigidi_RM Admission," item 2.
2. Analysis:
   i. [redacted] reviewed the indicated grant application with respect to the admission and concluded that "the admission of misconduct is accurate." [redacted] has not expressed questions and/or concerns about any other data/figures.
   ii. The original images and data for all figures were reviewed by the Forensics Illustrator, including figures/panels that were reported by the Respondent to be accurate. To confirm that images claimed to be accurate did not include unreported misconduct, the original images

were processed using acceptable and scientifically appropriate techniques in order to generate the published image files. Overall, the Forensics Illustrator was able to use the raw images to re-generate the published images with close approximation.

C. **Admission: Powerpoint presentation of falsified and fabricated data and figures to the UofU Department of Neurobiology ("*Appendix I*").**

1. Background: The Respondent has admitted to including falsified and fabricated data and figures in a PowerPoint presentation to the UofU Department of Neurobiology faculty. This presentation occurred in January 2020 as part of the Respondent's interview for a faculty job position at the UofU. The Respondent's complete and detailed accounting of all acts of falsification and fabrication related the PowerPoint are provided in "Supplement A: S.Brigidi_RM Admission," item 4.
2. Analysis:
   A comprehensive analysis of the PowerPoint ("PPT") presentation confirms that the following falsified and/or fabricated panels taken from the *Cell* publication were included in the following slides:
   - PPT Slide 6 includes Panels A and B of Figure 1
   - PPT Slide 7 includes Panels C and D of Figure 1
   - PPT Slide 8 includes Panels F and G of Figure 1
   - PPT Slide 9 includes Panels H and I of Figure 1
   - PPT Slide 10 includes Panel Q of Figure 1
   - PPT Slide 12 includes Panels J of Figure 1
   - PPT Slide 13 includes Panel P of Figure 2
   - PPT Slide 28 includes Panels L and M of Figure 1
   - PPT Slide 32 includes Panels P and Q of Figure 1

   During a detailed analysis of the PPT presentation, the RIO identified several images that were different from those in the *Cell* publication. The images in question turned out to be larger-magnification versions of images that were used in the *Cell* publication. The Respondent identified additional falsification of images in slides 7, 9 and 28. A detailed description of the further manipulation is provided in Supplement A, item 4. The RIO also reviewed original versions of images claimed to be accurate in order to confirm the absence of undisclosed falsification.

D. **Admission: Display of falsified data in poster hung outside Respondent's lab at the UofU ("*Appendix I*").**

1. Background: The Respondent has admitted to including a falsified figure taken from the NIH DP2 Grant application in a poster that was hung outside the Respondent's lab at the UofU. The Respondent's complete and detailed accounting regarding the poster is provided in "Supplement A: S.Brigidi_RM Admission," item 5.
2. Analysis: A review of the poster confirms that Figure 4 of the NIH Grant Application was included on the poster as Panel 1.

E. **Admission: Falsification of research record by misrepresenting images sent to UCSD in an initial effort to conceal research misconduct.**
   1. Background: The Respondent has admitted to sending UCSD images that were misrepresented as originals in an attempt to falsify the research record and cover-up questions/concerns re: his work. The Respondent's complete and detailed accounting regarding the images sent to UCSD is provided in "Supplement A: S.Brigidi_RM Admission," item 6.
   2. Analysis: The AVPRIC and RIO made a copy of the files that the Respondent sent to UCSD as part of this act of misconduct. The files in question are raw, original images without manipulation. The metadata for these files supports the Respondent's narrative.

F. **Brain & Behavior Research Foundation (BBRF) Grant Application ("*Appendix H*").**
   1. Background: The Respondent applied for and received an award from the BBRF. The Respondent has reported that the grant application does not include any falsified, fabricated, or plagarized images or data "Supplement A: S.Brigidi_RM Admission," item 3.
   2. Analysis: The BBRF grant application contains two figures. Although the BBRF application references the *Cell* publication and relies upon the Respondent's previous work to enhance credibility in support of the application, both figures from the BBRF grant are separate from the *Cell* publication and NIH DP2 Grant application. There is no evidence to indicate that either figures from the BBRF grant were falsified or the result of fabrication. In addition, the BBRF grant application is not associated with any PHS support.

Conclusions

Based upon the careful review of the research record in question, it is concluded by a preponderance of evidence that the Respondent's admissions to falsification and/or fabrication in the NIH DP2 Grant application, 2020 PowerPoint Presentation, lab poster, and image misrepresentation to UCSD are *accurate* and *complete*.

With regard to the Respondent's admission to falsification and/or fabrication in the 2019 *Cell* publication:

The acts of research misconduct performed at UCSD and published in the *Cell* paper fall under the jurisdiction of UCSD. Therefore, an official determination regarding the completeness and accuracy of the Respondent's admission is the responsibility of UCSD. However, in a good-faith effort to uncover the full scope of research misconduct, the UofU has diligently pursued a comprehensive admission from the Respondent and performed a thorough analysis of available evidence to confirm that the admission is complete and accurate. While the UofU is confident in the assessment performed, it would be inappropriate for the UofU to make a

formal determination regarding the accuracy or completeness of the Respondent's admission of misconduct with respect to the *Cell* paper without assessment from UCSD.

VI. Institutional Administrative Actions

Upon receipt of the Respondent's admission, the UofU:

- Placed the Respondent on a leave of absence
- Closed the Respondent's lab and began relocating affected personnel
- Suspended all spending on the NIH DP2 Grant award
- Suspended all spending on the BBRF Grant award

The Respondent has made arrangements with [redacted] to resign his position at the University of Utah upon completion of the UofU's misconduct assessment in July 2023.

From: Stefano Brigidi
Sent: Friday, July 21, 2023 2:44 PM
To: [redacted]
Cc: [redacted]
Subject: Re: Research Misconduct Admission Statement

Hi [redacted],
Thank you for keeping me informed and I'll await more information on next steps.

Sincerely,
Stefano

From: [redacted]
Sent: Friday, July 21, 2023 2:38 PM
To: Stefano Brigidi <stefano.brigidi@neuro.utah.edu>
Cc: [redacted]
Subject: Re: Research Misconduct Admission Statement

Dr. Brigidi,

Thank you for reviewing, editing, and confirming the final version.

I have sent you a final version of the document for signature in DocuSign.

Your commitment to this process and endurance in responding to our questions and request has been commendable. I know that this process has required a meaningful amount of your time and effort and want to thank you for your engagement throughout.

In accordance with the University's process for research misconduct reviews, you should expect to receive a letter next week from the VPR regarding your admission and our assessment. I will be in touch next week.

Sincerely,

[redacted]

Office of Research Integrity & Compliance (ORIC)
Research Administration Building (RAB) 108
75 S 2000 E
Salt Lake City, UT 84112

July 21, 2023

To: Dr. Caren J. Frost, PhD, MPH, Associate Vice President for Research Integrity & Compliance, University of Utah

Zachary Mitchell, BS, Research Integrity Officer (RIO), University of Utah

From: Dr. Gian-Stefano Brigidi, PhD, Assistant Professor, Neurobiology, University of Utah

RE: Admission of Research Misconduct

Dr. Caren Frost and Zachary Mitchell:

Acting in good faith, in the interest of scientific integrity and correction of the research record, I do freely admit to intentionally performing the following acts of research misconduct identified in the research publication, grant submissions, and other corresponding activities listed below:

1. **Brigidi GS, Hayes MGB, Delos Santos NP, Hartzell AL, Texari L, Lin P-A, Bartlett A, Ecker JR, Benner C, Heinz S, Bloodgood BL (2019). Genomic decoding of neuronal depolarization by stimulus specific NPAS4 heterodimers. Cell 179 :373-391. PMID: 31585079. P ("*Appendix A*")**
    a. Figure 1, Panels N and O: these two panels are completely fabricated. The fabrication was performed by intentionally creating data points to incorporate into and generate the graphs depicted in panels N and O that were not obtained from actual experiments nor as reported in the publication. The data points were fabricated to generate results consistent with the core findings reported in the publication.
    b. Figure 1, Panels H and P: these three panels are falsified. The 5-, 10-, and 15-minute images of each panel were inappropriately manipulated to make the images cleaner and more compelling. The manipulation was performed by generating a mask of NPAS4 immunofluorescent signal through GFP signal from tissue obtained from Thy1-GFP mice. Briefly, confocal images were acquired of three separate channels per brain slice; anti-NPAS4 immunostaining, GFP from Thy1-GFP transgenic signal, and anti-NeuN immunostaining. In Adobe photoshop, the raw anti-NPAS4 channel was layered on top of the raw GFP channel, and the "multiply" filtering function available among the visualization tools associated with layers was used to create a mask of NPAS4 immunofluorescence through the GFP signal, effectively making the images cleaner and more compelling. In the figure panels H and P, this mask is not disclosed in the merged images that are shown as NPAS4 in cyan and NeuN in magenta colors and therefore the images are misleading. This intentional manipulation of the 5-, 10-, and 15-minute images was done to enhance the appearance of the dendritic NPAS4 signal.
    c. Figure 1, Panel L: this panel is falsified. The 3-, 5-, 10-, 15-, and 90-minute images were inappropriately manipulated in the same manner as the 5-, 10-, and 15-minute timepoints in Panels H and P, as described above in item 1.b.

Note: The original, unmanipulated image files for Panels H, L, and P, along with the manipulated version, are provided as "***Appendix B***".

d. Figure 1, Panels A through J, L, M and P through T: these panels are falsified. The panels represent a mixture of real and fabricated data. Specifically, they are misrepresented through the incorporation of fabricated data. Two or three real data sets were combined with multiple (i.e., three to five) fabricated data sets to artificially inflate or amplify the N-value to the number reported in the paper (approximately six or seven, depending upon the panel). The fabrication of data was performed by intentionally creating data points to incorporate into and generate graphs with more compelling results consistent with the core findings of the publication. These fabricated data points were not obtained from actual experiments nor as reported in the publication. The real data was then falsified through the incorporation of the fabricated data.
e. Figure 2, Panels K and P: these two panels are falsified in the same manner as detailed in item 1.d., above.
f. Figure 3, Panels C and E: these two panels are falsified in the same manner as detailed in item 1.d., above.
g. Figure 4, Panels P and Q: these two panels are falsified in the same manner as detailed in item 1.d., above.
h. Supplemental Figure 2, Panel A: this panel has been falsified. The 3-, 5-, 10-, 15-, and 30-minute images have been inappropriately manipulated by misrepresenting the GFP signal as NPAS4 signal. However, because I did not make a mask of the two separate channels, this is different than the manipulation described in 1.b, above. Instead, I simply did not acquire a raw NPAS4 immunofluorescent channel and represented the GFP signal as NPAS4 in the images.
i. Supplemental Figure 2, Panel E: this panel has been falsified. The 60- and 90-minute images have been inappropriately manipulated in the same manner as detailed in item 1.h., above.

Note: The original, unmanipulated image files for Panels A and E, along with the manipulated version, are provided as "***Appendix C***".

j. Supplemental Figure 2, Panels B and F: these two panels are falsified in the same manner as detailed in item 1.d., above.
k. Supplemental Figure 2, Panels C, D, G and H: these four panels are completely fabricated. The fabrication was performed by intentionally creating data points to incorporate into and generate the graphs depicted in panels C, D, G, and H that were not obtained from actual experiments nor as reported in the publication. The data points were fabricated to generate results consistent with the core findings reported in the publication.
l. Supplemental Figure 3, Panel K: this panel has been falsified. The image labeled "Noc" has been inappropriately manipulated in the same manner as described in item 1.b., above.

Note: The original, unmanipulated image files for Panel K, along with the manipulated version, are provided as "***Appendix D***".

m. Supplemental Figure 6, Panels F and G: these two panels have been falsified. The images have been inappropriately manipulated in the same manner as described in item 1.b., above. However, in Panel F, the three images under the 100Hz/5min column have further manipulation: the GFP channel was further overlayed over the ARNT1 channel and the multiply feature in photoshop was used to restrict the ARNT1 signal through GFP. The effect of this intentional manipulation was to enhance the appearance of dendritic ARNT1 signal.

Note: The original, unmanipulated image files for Panels F and G, along with the manipulated version, are provided as "***Appendix E***".

n. Supplemental Figure 6, Panel H: this panel is falsified in the same manner as detailed in item 1.d., above.

Any other figures and panels from the *Cell* publication that are unmentioned in the summary above are accurate, unmanipulated, and reported correctly.

The fabrication and falsification described above was performed while I was a postdoctoral fellow in the laboratory of Dr. Brenda Bloodgood at the University of California San Diego.

2. National Institutes of Health (NIH) Grant Application No. 1DP2NS127276-01 ("*Appendix F*")

a. Figures 1 and 2 of the above-referenced grant application are cartoon schematics of falsified and fabricated data and findings contained in the publication identified in item 1, above.

b. Figure 4 is falsified. The 12 images in columns 2-4 (labeled as "EGR2", "FOS", and "ATF4") have been misrepresented. The misrepresentation was performed by intentionally mislabeling the microscope images in Figure 4 as immunofluorescent staining with antibodies against EGR2, FOS, and ATF4 when they were actually all stained with anti-NPAS4. Additionally, the "ITF Induction" graphs located at the far-right of Figure 4 have been falsified. The falsification was performed by intentionally "cherry-picking," or selecting and quantifying images that would yield immunofluorescent data in support of the grant proposal's narrative. The experiments were performed as described in the proposal, but the results were mislabeled and misrepresented in order to yield the desired result shown in the figure.

c. Figure 5 is falsified. The two images in the right-most column labeled as "Fixed; Confocal" have been misrepresented through inappropriate manipulation. The manipulation was performed by intentionally and selectively enhancing the brightness of the anti-NPAS4 immunofluorescent channel within the dashed box, but leaving the brightness unchanged in the surrounding areas of the image. The result of

this manipulation falsified the enhanced brightness of the NPAS4 signal selectively within the region of interest inside the dashed box.

Note: The original, unmanipulated "Fixed; Confocal" image files used in Figure 5, along with the manipulated versions are attached as "***Appendix G***".

d. Figure 6 is falsified. The 12 images in columns 2-5 (labeled as "SO", "Egr2", "Fos", and "Atf4") have been misrepresented. The misrepresentation was performed by intentionally mislabeling the microscope images in Figure 6 as RNA in situ hybridization with probes against Egr2, Fos, and Atf4 when they were actually all stained with Npas4 probes. Additionally, the quantification graphs located at the far-right of Figure 6 have been falsified. The falsification was performed by intentionally "cherry-picking," or selecting and quantifying images that would yield immunofluorescent data in support of the grant proposal's narrative. The experiments were performed as described in the proposal, but intentionally manipulated to yield the desired result shown in the figure.

The remaining data and images in Figures 4-6 are accurate, unmanipulated, and reported correctly. Figures 3, 7-9 are completely accurate as reported.

3. Brain & Behavior Research Foundation (BBRF) Grant Application No. 30946 ("*Appendix H*")

The above-referenced grant application does not contain any falsified or fabricated images or data. However, it should be noted that the application included reference to the falsified and fabricated work described in item #1, above.

4. PowerPoint Presentation ("*Appendix I*")

In January 2020, I interviewed for a faculty position at the University of Utah. As part of my Interview, I provided an oral seminar and PowerPoint presentation to the Department of Neurobiology regarding the work published in *Cell*. Item #1, above, includes a complete summary of falsified and fabricated data that from the *Cell* publication.

The PowerPoint includes the following falsified and/or fabricated figures and panels from the *Cell* publication:

a. Figure 1:

   i. Panels A and B (slide 6), C and D (slide 7), F and G (slide 8), H and I (slide 9), Q (slide 10), and J (slide 12)

   ii. Panels L and M (slide 28). Please note that although included in the PowerPoint slides, this slide was not shown during the presentation. The slide is positioned in the deck after the final acknowledgements slide and was included to answer any potential questions from the audience concerning results related the findings in Figure 1 panels L and M of the *Cell* publication. It was ultimately unneeded and not presented/disseminated.

b. Figure 2: Panel P (slide 13)

The PowerPoint also included unpublished images that also contained acts of falsification. The unpublished images that contain inappropriate manipulation are described below:

a. Slide 7: Along the top of slide 7 are six images, labelled "5" through "90" minutes. These six images are lower-magnification images of the same tissue sections shown below them, which were published in the *Cell* paper. Of these six images, the "30" minute timepoint image was manipulated using a GFP mask overlaid on top of raw NPAS4 immunofluorescence, in the same manner as described in item 1.b, above. The raw and manipulated images are attached as "***Appendix J***".

b. Slide 9: Along the top of slide 9 are six images, labelled "1" through "90" minutes. These six images are lower-magnification images of the same tissue sections shown below them, which were published in the *Cell* paper. Of these six images, the "10" minute timepoint image was manipulated using a GFP mask overlaid on top of raw NPAS4 immunofluorescence, in the same manner as described in item 1.b, above. The raw and manipulated images are attached as "***Appendix K***".

c. Slide 28: Along the top of slide 28 are seven images, labelled "HC" through "90" minutes. These seven images are lower-magnification images of the same tissue sections shown below them, which were published in the *Cell* paper. Of these seven images, the "3", "5", and "90" minute timepoint images were manipulated using a GFP mask overlaid on top of raw NPAS4 immunofluorescence, in the same manner as described in item 1.b, above. The raw and manipulated images are attached as "***Appendix L***".

    i. Please note that although included in the PowerPoint slides, slide 28 was not shown during the presentation, as described above under 4.a.ii.

5. Lab Poster ("*Appendix M*")

After establishing my lab at the University of Utah, in an effort to showcase the lab, I created a poster that hung outside the lab space. The poster included the falsified data described above in Figure 4 of the NIH Grant Application (i.e., item 2.b.). The falsified data was incorporated into Panel 1 of the poster.

Although the poster has no author line, it was made solely by me. Although two lab employees were listed in the bottom-right corner of the poster, they had no hand in creating the poster nor the data shown in it. The lab employees at the time were only included to show a lab roster. This poster has been removed and destroyed. A PDF version of the poster is attached for reference.

6. Microscope Images Sent to University of California San Diego (UCSD) ("*Appendix N*")

In May 2023, colleagues from UCSD raised questions/concerns about images contained in the publication referenced in item 1, above. In an initial attempt to conceal my misconduct, I provided multiple raw, unedited images to UCSD that I represented as the "original" images used in the publication. In truth, this misrepresentation was a falsification of the research record. The images provided had been acquired at UCSD both

before and after the paper was published, and some of the images had been acquired at the University of Utah after the paper was published. The metadata for these images with dates and/or locations past the date of the publication, demonstrates that they cannot be the original images obtained for the indicated publication.

The research misconduct detailed in items #2-6, above, were committed by me while at the University of Utah.

This admission represents a complete accounting of all research misconduct that I have committed. There is no further falsification, fabrication, or plagiarism to disclose.

DocuSigned by:
Stefano Brigidi
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Gian-Stefano Brigidi, PhD