

List of Exhibits

- 1. Legal Fees and Costs Paid by M.Z. Jacobson from 4/14/18 to October 14, 2021**
- 2. Professional Opinion from Chair and Professor Lynn Hildemann (Oct. 30, 2019)**
- 3. Declaration of Dr. Mary Cameron (March 19, 2022)**
- 4. Unpaid Legal Opinion by the Mitzel Group (October 11, 2017)**
- 5. Declaration of Prof. Robert W. Howarth (July 20, 2020)**
- 6. Declaration of Prof. Mark O. Diesendorf (August 4, 2020)**
- 7. Declaration of Prof. Anthony R. Ingraffea (July 22, 2020)**
- 8. Declaration of Prof. Peter A. Strachan (August 10, 2020)**
- 9. Declaration of Prof. Robert W. Howarth (July 19, 2021)**
- 10. Declaration of Prof. Mark O. Diesendorf (July 17, 2021)**
- 11. Declaration of Prof. Anthony R. Ingraffea (July 20, 2021)**
- 12. Declaration of Prof. Peter A. Strachan (September 3, 2021)**
- 13. Published Jacobson et al. Rebuttal to Clack et al – Jacobson 2017 (June 27, 2017)**
- 14. Letter from Prof. Chris Field about joint statement (June 26, 2017)**
- 15. Motion for Relief of Judgment by M.Z. Jacobson, D.C. Court (Sept. 24, 2021)**
- 16. Clack Reply to M.Z. Jacobson Motion, D.C. Court (Oct. 6, 2021)**
- 17. M.Z. Jacobson Reply to Clack D.C. Court (Oct. 10, 2021)**
- 18. Declaration of Mary A. Cameron (April 2, 2021)**
- 19. Letter from Kathy McClelland to M.Z. Jacobson (Oct. 17, 2017)**
- 20. Letter from Dr. Mary Cameron to Pres. Marc Tessier-Lavigne (Oct 27, 2019)**
- 21. Details of legal fee bills for which reimbursement is requested**

Summary of Unreimbursed Legal Expenditures by Mark Z. Jacobson since April 14, 2018 Relating to Washington D.C. Lawsuits

All receipts, except for the one on Oct. 24, 2021, are for legal fees paid to Cohen, Seglias, Pallas, Greenhall, and Furman PC; 900 7th St NW UNIT 725, Washington, DC 20001; (202) 466-4110 (lead attorney Paul Thaler, Esq.; pthaler@cohenseglias.com) from the personal account of Mark Z. Jacobson between May 18, 2018, and December 28, 2020, for legal work done on behalf of Mark Z. Jacobson in his role as a professor at Stanford University. Exh 21 shows the details of the bills.

The Oct. 14, 2021, payment, also from the personal account of Mark Z. Jacobson, was to satisfy a \$75,000 legal fee judgment of the Washington D.C. Court. The payment will be returned if the judgment is reversed (a motion to reverse the judgment has been filed), but the payment has been made.

Summary of payments:

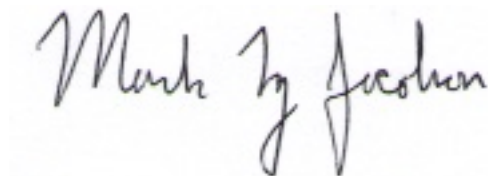
May 18, 2018	\$10,000
Jun 14, 2018	\$27,019.49
Aug 6, 2018	\$82.50
Aug. 21, 2020	\$15,000
Dec. 28, 2020	\$10,000
<u>Oct. 14, 2021</u>	<u>\$75,000</u>
Total	\$137,101.99

Of these payments, \$9,748.99 was for work done up to the February 22, 2018 voluntary dismissal without prejudice by Mark Z. Jacobson. The remaining \$127,353 was for work and fees incurred by Mark Z. Jacobson defending two lawsuits for attorney fees and costs after the voluntary dismissal without prejudice.

Details of all legal fee bills are provided in Exh 21.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge.

Sincerely,

A handwritten signature in black ink that reads "Mark Z. Jacobson". The signature is written in a cursive, flowing style.

Mark Z. Jacobson

Total Amount 10000.00 USD

Order Confirmation

Transaction State	APPROVED
Order id	C-50d11b35-7c43-4f6a-97fc-aa8d0000e3be
Time	5/18/18 4:15:18 AM
Ref. No.	05545D
Approval Code	Y:05545D1821577936:YYM:
Total	10000.00
Currency	USD
Card No.	(VISA) ... 2497
Valid to (month)	02
Valid to (year)	2021
InvoiceNumber	225442

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Total Amount **27019.49** **USD**

Order Confirmation

Transaction State APPROVED
Order id C-c923c0f5-11d5-41ea-adb9-138ebfd669b8
Time 6/14/18 2:50:37 PM
Ref. No. 00829D
Approval Code Y:00829D1825650526:YYM:
Total 27019.49
Currency USD
Card No. (VISA) ... 2497
Valid to (month) 02
Valid to (year) 2021
InvoiceNumber 226398

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Total Amount **82.80** **USD**

Order Confirmation

Transaction State APPROVED
Order id C-43724760-423d-43f6-9ee8-ed1090be56e1
Time 8/6/18 10:29:57 PM
Ref. No. 08732D
Approval Code Y:08732D1832927089:YYM:
Total 82.80
Currency USD
Card No. (VISA) ... 2497
Valid to (month) 02
Valid to (year) 2021
InvoiceNumber 227744

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Total Amount **15000.00** **USD**

Order Confirmation

Transaction State	APPROVED
Order id	C-c7539686-e84a-4b2f-96eb-1e083968ff8c
Time	8/21/20 7:27:39 PM
Ref. No.	02201D
Approval Code	Y:02201D1909257257:YYM:
Total	15000.00
Currency	USD
Card No.	(VISA) ... 2497
Valid to (month)	02
Valid to (year)	2021
InvoiceNumber	253467

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Total Amount **10000.00** **USD**

Order Confirmation

Transaction State **APPROVED**
Order id **C-e1f08552-5038-45ea-ac79-d52ebf211ece**
Time **12/28/20 2:53:02 PM**
Ref. No. **09071D**
Approval Code **Y:09071D1917277791:YYM:**
Total **10000.00**
Currency **USD**
Card No. **(VISA) ... 2497**
Valid to (month) **02**
Valid to (year) **2021**
InvoiceNumber

All payment information are
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layer) connection.

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Subject: Re: Payment information
From: "Marrocco, Drew W." <drew.marrocco@dentons.com>
Date: 10/14/21, 6:58 PM
To: Mark Z Jacobson <jacobson@stanford.edu>

Funds received. Thanks.

Sent from my iPad

[http://logo.dentons.com/dentons_logo.png]

Drew W. Marrocco

What's Next? The answer is Talent. With more than 20,000 people, 12,000 lawyers and 200 locations, Dentons has the talent for what you need, where you need it.

D +1 202 408 6387 | US Internal 26387
drew.marrocco@dentons.com<<mailto:drew.marrocco@dentons.com>>
Bio<<http://www.dentons.com/ch.aspx?email=drew.marrocco@dentons.com&action=biolink>> |
Website<<http://www.dentons.com>>

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On Oct 14, 2021, at 1:08 PM, Mark Z Jacobson <jacobson@stanford.edu> wrote:

ï»¿ [WARNING: EXTERNAL SENDER]

Just submitted it now. Hopefully will go through this time.



FREMONT BANK

MEMBER FDIC

39150 Fremont Blvd
Fremont CA 94539
(800) 359-2265

Your wire request for \$75,000.00 will be debited from account XXXXX261.
In addition, a \$30.00 wire fee has been assessed.

*** WIRE DETAILS ***

Wire Sequence

238702

Business Code / Wire Type

CTR-Customer Transfer
1000-Basic Funds Transfer

Originator Information

Originating FI

FREMONT BANK
39150 FREMONT BLVD.
FREMONT, CA 94538
United States

Originator

MARK Z JACOBSON
D XXXXX261
946 VALDEZ PLACE
STANFORD CA 94305-0000
United States

Originator To Beneficiary

LEGAL FEE PAYMENT

Entered Date

10/14/2021 09:32 AM Pacific Time

Effective Date

10/14/2021

Receiving Financial Institution

031100649 DISCOVER BANK

Beneficiary Information

Beneficiary

DR CHRISTOPHER T M CLACK
D XXXXXX288
NOT PROVIDED
United States

Beneficiary FI Name

DISCOVER BANK
F XXXXX649
502 EAST MARKET STREET
GREENWOOD, DE 19950
United States

SIGNATURE

DATE 10/14/2021

I/we agree to the information contained herein and conditions in the Outgoing Wire Transfer Agreement, which is incorporated herein by reference.
I/we certify that the information contained herein is true, complete and accurate, of my own personal knowledge.

Customer (person(s) entering into this transaction) acknowledges that any payment order executed by Fremont Bank will be subject to rules and regulations applicable to payment orders, including record keeping and information transmittal requirements under the Federal Bank Secrecy Act and its implementing regulations. Customer(s) acknowledge(s) and agrees that Fremont Bank may capture and transmit information regarding customer(s) (for example, customer's name, address and account number) and regarding any beneficiary (for example, beneficiary's name, address, other beneficiary identifiers, and beneficiary's account number) as part of the processing of a payment order. Customer(s) agree(s) to assist Fremont Bank in connection with any requirements imposed on Fremont Bank in fulfilling Fremont Bank's obligations in this regard.

ID Method: CADL ID Number XXXXXX ID Expiration Date 9/26/25

Name and Phone Number of Main Contact:

MARK Z JACOBSON 650-468-1599

I certify that funds are available in the Customer's account and submit this transfer request.

Bank Personnel Signature

DW11217

Date 10/14/21

Phone: 650-395-2761

Authorized By _____ Date _____ Time: _____

OUTGOING WIRE TRANSFER AGREEMENT

(Bank account and DL numbers redacted)

EXHIBIT 2

Stanford | **ENGINEERING**
Civil & Environmental Engineering

Lynn Hildemann
Professor and Chair,
Department of Civil and Environmental
Engineering

October 30, 2019

TO: Prof. Marc Tessier-Lavigne

Prof. Mark Jacobson, a faculty member in my department, has asked me to write a letter addressing whether reputation is essential to the career of an environmental researcher.

I can confirm this is true with 100% certainty, both in my role as the department chair of Civil & Environmental Engineering, and as a long-time researcher in the environmental field.

Mark Jacobson sought Stanford's help, via multiple avenues, in reversing the damage to his scientific reputation caused by the publication of the Clack et al. paper in 2017. No assistance was provided by Stanford, which left Mark Jacobson in a position where he felt he had no choice but to pursue other pathways for trying to protect both his own reputation and that of his PhD student.

Sincerely,



Lynn M. Hildemann, PhD

Chair, Civil & Environmental Engineering Department
Professor in Environmental Engineering

Declaration of Mary A. Cameron, Ph.D.

Mary A. Cameron
3210 Wisconsin Ave NW Apt 701
Washington, D.C., 20016
maryacameron@gmail.com
(480) 330-0599

Facts

1. I was a PhD student at Stanford University under Mark Jacobson from 2011 to March 2017. In 2015, I co-authored the Jacobson et al. PNAS paper that received the Cozzarelli Prize for scientific excellence. For that study, I ran hundreds of modeling simulations to show the robustness of our conclusions, and aggregated them into metrics and tables referenced throughout the text. I created post-processing scripts that automated the process of transcribing values from the model output files into the manuscript, so I could easily verify that every value in the manuscript was consistent with our model.
2. The Clack et al. 2017 paper that followed alleges that results in our manuscript were based on modeling errors. These allegations did not have any basis in fact. Our modeling logic had been consistent with the modeled output, and the modeled output had been consistent with the numbers printed in the manuscript. I had personally ensured they were correct, and I take pride in that work.
3. After graduating, I did not have the finances to sustain a longer job search, but had felt confident enough in my academic accomplishments to find something in my field before going into debt. It was during this time that I learned PNAS would be publishing the Clack et al. paper. The author list included prominent researchers at prestigious institutions, including Stanford University. Once published, I believed the article's title and the author list alone would leave me with far fewer job prospects. I had been interviewing for full-time jobs as a data scientist in the climate and energy sectors. Within days, I accepted the first offer I received: an hourly contract position at an e-commerce company, with an offer of full-time employment if I could prove my modeling skills over the coming weeks. Though it was far from my desired position, I was confident I would excel, and intended to rejoin the sustainability sector after gaining work experience. I was still on contract when the PNAS Clack et al. paper was

published, and news articles surrounding the controversy were entering the public and scientific discourse.

Short-term damages to career

4. The allegations of modeling errors had both short- and long-term consequences on me and my professional reputation. Co-workers had learned of the article, and I reported the situation to my supervisors to get ahead of the false rumors. These allegations jeopardized my prospects of being offered full-time employment because of the damage to my reputation as a modeler. When I was extended a permanent offer several weeks later, the shared knowledge of my damaged reputation implied I would have difficulty obtaining competing offers, and greatly weakened my bargaining position.

Long-term damage to career

5. The allegations that we had made modeling errors were repeated in high-impact press releases and tweets that were broadly distributed within the scientific community and to the general public. I was still finishing research papers with colleagues who knew I was a qualified and meticulous modeler, and others who had been helping me network and find job openings in the field. Despite this, the gossip of modeling errors outran the prestige I should have been able to leverage with the Cozzarelli Prize.
6. Moreover, because I was trying to return to the environmental sector after e-commerce, my work as a PhD student was the subject matter that connected me to the field. The work I did as a PhD student, with my PhD advisor, would help me secure future interviews, and thus was extremely important to my career. Damage to the reputation of my PhD advisor removed the credibility I had by association, and working outside the field leaves me with few opportunities to reclaim it. This negative attention puts me at a disadvantage in pursuing a career in the energy and environmental fields, which are my greatest areas of interest. Prospective employers have asked negative questions about the surrounding controversy as recently as Spring 2021, four years after the events took place.

Attempts to seek help through Stanford

7. As my PhD advisor, Mark Jacobson was aware of how the damage to my reputation was affecting my career. We had been communicating about his efforts to create a statement of agreement with the Clack et al. authors, mediated by Chris Field, a Stanford faculty member and global leader among climate scientists. When it became clear that that statement was not going to be published and I had been personally accused of raising tensions, I met privately with Stanford Professor Margot Gerritsen, a committee member on my PhD and longtime mentor, for help. Together, we met with Chris Field to discuss options. I had communicated that I was greatly distressed by the situation, and that I did not know what the right course of action should be. I did not want to do anything to ruin climate progress, which I had dedicated my career to advance, or the reputation of Stanford climate research, which had been my home for nearly a decade. Secondly, I was very concerned that if I stayed quiet about what I felt was academic dishonesty in the Clack et al. claims, my reputation would forever be damaged, and I would not be able to return to the climate or energy fields. I wanted to clear my name, but not at the cost of my community.
8. Over the course of the meeting, Professors Gerritsen and Field reassured me that laying low was best, and that there were people at Stanford with the power to control the narrative who were taking care of it. I was immensely relieved to hear Stanford would work on a solution.

Damage to career lessened by Mark Jacobson's actions

9. Professors Gerritsen and Field recommended I speak with the Stanford Ombudsman on any actions I might take. I met with the Ombudsman on July 5, 2017, but as I was no longer a Stanford student, any courses of action within the university were limited. He suggested I reach out to the journal if I have issues with the publication. Knowing that Dr. Jacobson had already retained a lawyer over the actions of PNAS, and having little faith my further involvement would accomplish anything constructive, I did not contact PNAS.
10. I had informed Dr. Jacobson that I would be laying low for my own mental health and job security, but that I supported his lawsuit and would help where I could. I have always been supportive of Dr. Jacobson's legal actions, because I felt it would be the only way to clear my name by holding PNAS those outside Stanford accountable. Because I knew he was seeking truth through Stanford and the courts, I did not have to take actions of my own. I did not have a Stanford affiliation or money for an attorney, but I had trusted my PhD advisor and my

former institution to do the right thing. Having witnessed the official responses from Stanford University, I believe the University has been negligent in its duty to protect me from those at the University who have damaged my career with false facts, which in turn damaged my ability to rejoin the scientific community and industrial sectors I had been most qualified to enter. I believe Mark Jacobson has been right to take legal actions to correct the public record, and that his doing so has shielded me from further damage to my career.

I swear all the above to be true.

19 March 2022

[DATE]



Mary A. Cameron, PhD

EXHIBIT 4

Subject: Fwd: Question about California Labor Code 2802
From: Amelia Lancaster <alancaster@mitzelgroup.com>
Date: 10/11/17, 3:29 PM
To: jacobson@stanford.edu
CC: Krista Mitzel <kmitzel@mitzelgroup.com>, Mary Fong <mfong@mitzelgroup.com>

Professor Jacobson,

Thank you for reaching out to us. As you may now, we specialize in counseling and representing employers and management in all matters related to California labor and employment law.

In response to your question, Section 2802 of the California Labor Code requires an employer to reimburse an employee for all necessary costs or losses incurred in the direct consequence of his or her duties. Courts have applied this statute broadly in favor of employees with the underlying policy that employer's should not pass operating expenses on to employees.

Whether an employee's defamation claim would be considered a necessary cost or an action taken in direct consequence of the employee's duties depends on several factors. A court would have to consider the effect the defamation had on the employee's reputation and, subsequently, whether upholding the employee's reputation in light of such defamation is necessary to the employee's position or to the employer.

To better assess the situation, we'd need to know more about the employee's position and his or her defamation claim. We're happy to speak by phone and discuss this issue with you in more detail if you'd like.

Please let us know if you'd like to set up a call or have any other questions.

Best regards,

Amelia M. Lancaster

Amelia M. Lancaster
Associate Attorney
The Mitzel Group, LLP
44 Montgomery Street, Suite 1660
San Francisco, California 94104
Direct: (415) 349-7443
Facsimile: (415) 735-3572
Email: alancaster@mitzelgroup.com

<http://mitzelgroup.com/>

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From: **Mark Z. Jacobson** <jacobson@stanford.edu>
Date: Mon, Oct 9, 2017 at 9:05 PM
Subject: Question about California Labor Code 2802
To: info@mitzelgroup.com

Hi, I was reading

<http://mitzelgroup.com/employers-not-always-responsible-for-employees-legal-expenses/>

and have a question.

Does an employer need to indemnify an employee for legal costs of the employee under California Labor Code 2802 if the employee needs to hire an attorney to correct defamation of the employee by a third party arising in the course of the employee's work?

How about if the defamation is due in part to other employees of the same employer?

Thank you,

Sincerely,

Mark Jacobson

--

Mark Z. Jacobson
Professor of Civil and Environmental Engineering

Director, Atmosphere/Energy Program Phone: [650-723-6836](tel:650-723-6836)
Stanford University Fax: [650-723-7058](tel:650-723-7058)
Yang & Yamazaki Environ. and Energy Bldg jacobson@stanford.edu
[473 Via Ortega, Room 397](#) Twitter: @mzjacobson
Stanford, CA 94305-4020 www.stanford.edu/group/efmh/jacobson/

EXHIBIT 5

Declaration of Dr. Robert Howarth

1. My name is Robert W. Howarth, Ph.D. I am over the age of 18 and competent to make the following Declaration.
2. I have been a tenured faculty member at Cornell University, Ithaca, NY, since 1985. Since 1993, I have held an endowed position at Cornell as the *David R. Atkinson Professor of Ecology & Environmental Biology*.
3. I have extensive experience in academic publishing. I am the author or co-author of over 200 papers, and these have been cited by others in the peer-reviewed literature more than 65,000 times. I am the Founding Editor of the academic journal *Biogeochemistry* and served as Editor-in-Chief of that journal from 1983 to 2004. I was also the Editor-in-Chief of the academic journal *Limnology & Oceanography* from 2014 to 2019.
4. I served on the Committee on Ethics of the America Society for Limnology & Oceanography from 1992-1998. I served as President-Elect and then President of the Coastal & Estuarine Research Federation from 2005 to 2009, overseeing the publications and ethical issues of that professional society. And I have been a member of the Committee on Publication Ethics (COPE) since 2014. COPE “is a nonprofit organization whose mission is to define best practice in the ethics of scholarly publishing and to assist editors, publishers, etc. to achieve this.” (https://en.wikipedia.org/wiki/Committee_on_Publication_Ethics)
5. I am aware of the litigation filed by Dr. Mark Jacobson against Dr. Clack and others associated with writing and publishing the paper entitled “Evaluation of a proposal for reliable low-cost grid power with 100% wind, water and solar,” *PNAS*, doi:1073/pnas.1610381114, 2017 (the “Clack Paper”).
6. I am not a party to the litigation and have not participated in the litigation prior to filing this Declaration.
7. I was not associated with the publication of the Clack Paper nor of the 2015 paper by Dr. Jacobson and others, also published in *PNAS*, that was the subject of the Clack Paper.
8. I have previously collaborated with Dr. Jacobson and am a co-author of two papers with him published in 2013 and 2014 (Jacobson, M.Z., R.W. Howarth, M.A. Delucchi, S.R. Scobies, J.M. Barth, M.J. Dvorak, M. Klevze, H. Katkhuda, B. Miranda, N.A. Chowdhury, R. Jones, L. Plano, and A.R. Ingraffea, 2013, “Examining the feasibility of converting New York State’s all-purpose energy infrastructure to one using wind, water, and sunlight,” *Energy Policy* 57: 585-601, doi.org/10.1016/j.enpol.2013.02.036i; and Jacobson, M.Z., M.A. Delucchi, A.R.

Ingraffea, R.W. Howarth, G. Bazouin, B. Bridgeland, K. Burkart, M. Change, N. Chowdhury, R. Cook, G. Escher, M. Galka, L. Han, C. Heavey, A. Hernandez, D.F. Jacobson, D.S. Jacobson, B. Miranda, G. Novotny, M. Pellat, P. Quach, A. Romano, D. Steward, L. Vogel, S. Wang, H. Wang, L. Willman, and T. Yeskoo, 2014, "A roadmap for repowering California for all purposes with wind, water, and sunlight," *Energy*, doi.org/10.1016/j.energy.2014.06.099).

9. I have carefully reviewed both the Jacobson et al. 2015 paper and the Clack Paper.
10. The Clack Paper claimed that Table 1 in the Jacobson paper presented maximum values, and they therefore concluded that the Jacobson et al. a discrepancy between the table and figures presented in the paper. The Clack Paper is wrong with regard to this claim. Table 1 presented average values. Consequently, the Clack Paper is also wrong to have concluded there was any discrepancy. There was not. It is not at all apparent how the Clack Paper reached this erroneous conclusion, which lies at the heart of their criticism of the paper by Jacobson and colleagues.
11. The Jacobson et al. 2015 paper includes hydro power from Canada. The Clack Paper failed to recognize this, and therefore mistakenly claimed that the annual average hydro-power values used by Jacobson et al. were too high: the Clack Paper was wrong in their assumption that the hydro values in Jacobson et al. were just for power produced within the United States.
12. The issues I address in points #10 and #11 above are questions of fact, and are examples where the Clack Paper failed to follow due diligence. In my professional judgement, these facts can be correctly determined from evidence in the Jacobson et al. paper and in the sources cited there. Beyond that, if Dr. Clack and his colleagues were confused, normal scientific practice would have been for them to directly contact Dr. Jacobson for clarification, rather than to publish the critique as they did in the Clack Paper.
13. As an expert on scientific publishing, I conclude that the Clack Paper should not have been published in the *Proceedings of the National Academy of Sciences* as a "Research Article." The Clack Paper is clearly not a research article, either as generally defined by the community of research scientists or as specified by the journal's own guidelines. These guidelines state that the journal only publishes research articles if they are based on "original scientific research of exceptional importance..." (<https://www.pnas.org/page/authors/purpose-scope>). There was no original research in the Clack Paper.
14. The Clack Paper was written specifically and exclusively as a comment on the Jacobson et al. paper. There were no new data presented. There were no hypotheses tested. This was not original research. As such, if it were to have been published at all, it should have been

published as a “Letter” or as a “Commentary.” This is true under either general science-publishing traditions or the specific rules and guidelines of the *Proceedings of the National Academy of Sciences* (<https://www.pnas.org/page/authors/purpose-scope>). Note that these journal guidelines specify that Letters be used to “point out potential flaws in studies published in the journal.” That is not the purpose of a Research Article.

15. In my professional opinion, the publication of the Clack Paper falls outside of the bounds of normal scientific debate. PNAS did not follow normal publication procedures, defined either in terms of general norms in our field or the specific guidelines of their own journal. I believe this caused harm to the reputation of Dr. Jacobson.

I declare under penalty of perjury that the foregoing is true and correct, to the best of my knowledge. Executed on July 20, 2020 from my home in Trumansburg, NY.

A handwritten signature in black ink, reading "Robert W. Howarth". The signature is written in a cursive style with a large, sweeping initial 'R'.

Robert W. Howarth, Ph.D.

**SUPERIOR COURT OF THE DISTRICT OF COLUMBIA
CIVIL DIVISION**

Mark Z. Jacobson, Ph.D.,

Plaintiff,

v.

Christopher T.M. Clack, Ph.D.

and

National Academy of Sciences,

Defendants.

2017 CA 006685 B

Judge Elizabeth Wingo

Next Court Date: None Scheduled

DECLARATION OF DR MARK O. DIESENDORF

Declaration of Dr Mark O. Diesendorf

1. My name is Mark O. DIESENDORF, I am over the age of 18 years and am competent to make the following declaration.
2. I am currently Honorary Associate Professor at UNSW Sydney, formerly called the University of New South Wales. Previously, at various times before my nominal retirement in 2016, I was a Principal Research Scientist in Australia's national research organization, CSIRO; Professor of Environmental Science and Founding Director of the Institute for Sustainable Futures at University of Technology Sydney; Associate Professor and Deputy Director of the Institute of Environmental Studies at UNSW Sydney; and Education Program Leader of the Australian Cooperative Research Centre for Low Carbon Living. As an author or coauthor, I have published 78 peer-reviewed journal papers, three scholarly books, 36 scholarly book chapters and 13 peer-reviewed conference papers.
3. From 2011 to 2016 I was a senior researcher in a research program at UNSW Sydney that performed computer simulation modelling of the operation of the Australian National Electricity Market running entirely on renewable energy. I am co-author of several peer-reviewed journal papers on this particular topic. This research is similar to that conducted on the electricity systems of the United States of America by Dr Mark Jacobson. Therefore, I have expertise in the scientific issues discussed in Dr Jacobson's and Dr Clack's journal papers published in PNAS in 2015 and 2017 respectively. I have studied both papers.
4. I understand that Dr Jacobson has initiated litigation against Dr Clack on the grounds that the Clack paper and public statements by Dr Clack misrepresent Dr Jacobson's paper.
5. I have not been involved in this litigation prior to making this declaration am not a co-author of either of the papers relevant to this litigation.
6. Dr Jacobson has requested my expert opinion on whether three issues raised in the case are matters of fact or of scientific disagreement.

7. As a scientist, I understand that a fact is something that has either been proven to be true or is true by definition or logical argument. The following are examples of facts:
 - 7.1 That I am an Australian citizen, because it can be verified by inspection of my birth certificate and passport.
 - 7.2 That, if 2 and 3 are real numbers, $2 + 3 = 3 + 2 = 5$.
 - 7.3 That the Earth is warming, because it has been verified by scientific measurements taken over decades by many independent research groups based in different countries.
8. As a scientist, I understand that a scientific disagreement can occur when we have incomplete information about the system of interest and different scientific hypotheses can be held that are consistent with the available data, logic and existing scientific facts. For example, it is at present a matter of scientific disagreement as to whether there is any kind of life on Mars or whether human-induced climate change is already irreversible by human actions.
9. I wish to emphasize that disagreement between scientists is not always the same as 'scientific disagreement'. For example, a scientist who dislikes me could claim incorrectly that I am not an Australian citizen, although I can supply strong documentary evidence to show that I am an Australian citizen. This disagreement between scientists is not a scientific disagreement, because the scientist making the incorrect claim is not basing it on science but rather on emotion.
10. Another example of a disagreement between scientists that is not a scientific disagreement is the following. Based on their religious beliefs, a scientist could claim that the earth was created literally in seven days, but to do this they would have to ignore all the fossil, geological and biological evidence to the contrary; this disagreement is not a scientific disagreement.
11. Dr Jacobson asserts that the following three questions raised in the litigation are issues of fact and not issues of scientific disagreement:
 - 11.1 Does Table 1 of the Jacobson paper, published in PNAS in 2015, contain maximum or average values?

11.2 Did the Jacobson PNAS paper contain imported Canadian hydro power as part of its results?

11.3 Is there a modelling error in Jacobson's LOADMATCH computer code that he used in his PNAS paper?

12. My assessment is that Question 11.1 is a question of fact that I have verified from studying both the Jacobson PNAS paper itself and its reference 22 (also by Jacobson), which is the source of the data in Table 1 of Jacobson's PNAS paper. Furthermore, the latter reference states clearly on page 2095 that 'The table is derived from a spreadsheet analysis of annually *averaged* end-use load data' (my italics). Therefore, the answer to Question 11.1 is 'average', as stated by Jacobson.
13. My assessment is that Question 11.2 is a question of fact that I have verified from both the Jacobson PNAS paper itself together with its reference 22, which states clearly on page 2102 that 'In addition, 23 U.S. states receive an estimated 5.103 GW of delivered hydroelectric power *from Canada*' (my italics). Therefore, the answer to Question 11.2 is 'yes', as stated by Jacobson.
14. Whether Question 11.3 is a question of fact or of scientific disagreement depends on the definition of 'modeling error'. As a modeler myself, I believe that the vast majority of scientists would interpret 'modeling error' as an error or bug in the computer code, as I do. Such an apparent scientific disagreement can be resolved *factually* from expert examination of the computer code and the model output. To establish the existence of such a modelling error, Clack would have to present evidence identifying it. His paper fails to do this and therefore fails to establish that there is a genuine scientific disagreement.
15. Instead, Clack's paper identifies results he contests in Jacobson's paper and includes them in the section of Clack's paper called 'Modeling Errors'. In my assessment the Clack paper is claiming the contested results are due to computer bugs in the LOADMATCH computer model.
16. In particular, the following statement is in the Clack paper's section on Modeling Errors:

‘In fact, the flexible load used by LOADMATCH is more than double the maximum possible value from table 1 of ref. 11. The maximum possible from table 1 of ref. 11 is given as 1,064.16 GW, whereas figure 3 of ref. 11 shows that flexible load (in green) used up to 1,944 GW (on day 912.6). Indeed, in all of the figures in ref. 11 that show flexible load, the restrictions enumerated in table 1 of ref. 11 are not satisfied.’

In my reading, the quoted sentences claim that Jacobson’s paper has a software bug, because Jacobson’s figures don’t match their Table 1. But this claim is based on Clack’s factually incorrect reading of the values in Jacobson’s Table 1, as pointed out in Paragraph 12 of this Declaration. Clack has assumed incorrectly that Jacobson’s Table 1 contains maximum values when it actually contains average values. Therefore, this Claim by Clack, that Jacobson’s paper contains a modelling error, i.e. an error or bug in the computer code, has not been established.

17. Similarly, the following statement is in the Clack paper’s section on Modeling Errors:

‘For example, the numbers given in the supporting information of ref. 11 imply that maximum output from hydroelectric facilities cannot exceed 145.26 GW (SI Appendix, section S1.1), about 50% more than exists in the United States today (15), but figure 4B of ref. 11 (Fig. 1) shows hydroelectric output exceeding 1,300 GW.’

Once again, I read this as a claim that Jacobson’s paper contains an error or bug in the computer code, because the Clack paper states Jacobson’s figure 4B, which derives from the LOADMATCH computer program, has values that exceed 145.26 GW, thus a discrepancy exists between model output and other data from the paper. Again, whether such a difference is due to a computer bug can be determined factually, thus is a question of fact, not a question of scientific disagreement.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on 4 August 2020.

markdiesendorf

Mark Oliver Diesendorf

Digitally signed by markdiesendorf
DN: cn=markdiesendorf, o=UNSW,
ou=School of Humanities & Languages,
email=m.diesendorf@unsw.edu.au, c=AU
Date: 2020.08.04 10:28:10 +10'00'

**SUPERIOR COURT OF THE DISTRICT OF COLUMBIA
CIVIL DIVISION**

Mark Z. Jacobson, Ph.D.,	)	
	)	
Plaintiff,	)	
	)	
v.	)	2017 CA 006685 B
	)	Judge Elizabeth Wingo
Christopher T.M. Clack, Ph.D.	)	Next Court Date: None Scheduled
	)	
and	)	
	)	
National Academy of Sciences,	)	
	)	
Defendants.	)	
_____	)	

DECLARATION OF DR. ANTHONY R. INGRAFFEA

DECLARATION OF DR. ANTHONY R. INGRAFFEA

1. My name is Dr. Anthony R. Ingraffea. I am over the age of 18 and competent to make the following Declaration.
2. I currently am the Dwight C. Baum Professor of Engineering, Emeritus, at Cornell University.
3. I am author or co-author of over 250 peer-reviewed technical publications, including papers in the PNAS.
4. I have authored or co-authored papers related to the ongoing national energy transition, including papers co-authored by Dr. Jacobson.
5. I am aware of the litigation filed by Dr. Jacobson and certain claims related to papers entitled Jacobson MZ, Delucchi MA, Cameron MA, Frew BA (2015a) *Low-cost solution to the grid reliability problem with 100% penetration of intermittent wind, water, and solar for all purposes*, PNAS 112:15060–15065 and Jacobson MZ, Delucchi MA, Cameron MA, Frew BA (2015b) *Low-cost solution to the grid reliability problem with 100% penetration of intermittent wind, water, and solar for all purposes*, PNAS 112:15060–15065 (the “Jacobson papers”), and *Evaluation of a proposal for reliable low-cost grid power with 100% wind water and solar*, PNAS, doi:1073/pnas.1610381114, 2017 (the “Clack paper”). I am not a co-author of any of these papers, and am examining them as an independent scholar for the purposes of this declaration.
6. I was not named as a defendant in the litigation and have not participated in the litigation prior to submitting this Declaration.
7. The Clack paper claims that the Jacobson Papers “...do not show the technical, practical, or economic feasibility of a 100% wind, solar, and hydroelectric energy vision...” and contain “...modeling errors; incorrect, implausible, and/or inadequately supported assumptions; and the application of methods inappropriate to the task.” The purpose of my declaration is to refute three (3) of the most important claims of the Clack paper and their assertion that it is mere “scientific disagreement” that is the space between theirs and the Jacobson papers.
8. Claim #1: The Clack paper bases much of its allegations pertaining to unfeasibility, inaccuracy, and modeling errors on its incorrect assessment of Table 1 in the Jacobson paper (2015a). Clearly, Clack *et al.* incorrectly assessed the numbers in Table 1 as “maximum” values. They state:

“The **maximum** possible from table 1 of ref. 11 is given as 1,064.16 GW, whereas figure 3 of ref. 11 shows that flexible load (in green) used up to 1,944 GW (on day 912.6). Indeed, in all of the figures in ref. 11 that show flexible load, the restrictions enumerated in table 1 of ref. 11 are not satisfied.” (**emphasis mine**)

The Jacobson paper (2015a) clearly states, through a footnote citation to an earlier Jacobson paper (Jacobson *et al.* Energy and Environmental Sciences, 2015), that the numbers in Table 1 are not “maximum” values, but rather “average” annual values. This is not a matter of scientific disagreement. Rather, it is a matter of fact: the numbers in Table 1 are either maximum values, or they are average values. It is not a matter of scientific disagreement to state that, for example, two parties can look at the set of numbers, 5-6-7-8-9-10, and disagree on the point that their average is 7.5 while their maximum is 10. That would be a disagreement of fact, not opinion, scientific or otherwise. This is a crucial point, because subsequent incorrect allegations based on this error in fact percolate throughout the remainder of the Clack paper, as they themselves state:

“Indeed, in all of the figures in ref. 11 that show flexible load, the restrictions enumerated in table 1 of ref. 11 are not satisfied.”

9. Claim #2: Clack alleges that it is only “scientific disagreement” concerning the Jacobson paper use of Canadian hydropower in its calculations. Again, this is a matter of fact, not opinion: either it does or it does not include such imports. The Clack paper clearly errs in **fact** in asserting that hydroelectric output used in the Jacobson paper calculations is from U.S. facilities only:

“For example, the numbers given in the supporting information of ref. 11 imply that maximum output from hydroelectric facilities cannot exceed 145.26 GW (SI Appendix, section S1.1), about 50% more than exists in the United States today (15).”

However, in a footnote to Table S2 of the Jacobson paper (2015a), there is clear reference to the same earlier Jacobson paper which clearly defined hydropower capacity used in Jacobson’s calculations as the sum of both U. S. supplies and imported Canadian supplies.

10. Claim #3: The Clack paper includes a distinct section entitled “Modeling Errors” implicating Jacobson’s LOADMATCH computer program as a source of such alleged errors. However, the Clack paper also includes a distinct section entitled “Implausible Assumptions”. I have led the development of many predictive computer programs, including highly successful commercial programs, and am very aware of the distinction between an alleged modeling error and an implausible assumption in the execution of a computer program. A modeling error is commonly known as a “bug” in the code: given correct input, it gives incorrect, or no, output. A code is not “buggy” if it is given incorrect input but correctly performs all its intended operations on that input; in this case, the incorrect input was based on incorrect or implausible assumptions. Therefore, I conclude that the Clack paper was asserting in its “Modeling Error” section the existence of a “bug” or “bugs” in LOADMATCH; else, why include a separate section called “Implausible Assumptions”?

11. Together, claims #1, #2, and #3 indicate to me a degree of carelessness in the Clack paper that should have been caught and corrected, pre-publication, by one or more of the 21 co-authors of the paper and/or by one or more of its PNAS reviewers.

I declare under penalty of perjury that the foregoing is true and correct. Executed on July 22, 2020.

A handwritten signature in black ink, appearing to read 'A. Ingraffea', with a long horizontal flourish extending to the right.

Anthony R. Ingraffea

Declaration of Professor Peter A. Strachan

1. My name is Peter Anderson Strachan. I am over 18 years of age and am competent to make the following declaration.
2. I have been an academic member of staff at the Robert Gordon University, Aberdeen, Scotland, since 1993. I am currently Professor of Energy Policy at the Aberdeen Business School. I was appointed Professor of Energy Policy in 2009 and subsequently appointed in 2010 to the role of Group Lead for Strategy and Policy, responsible for a research and teaching group of approximately 20 full-time and part-time academic staff. Following University re-organisation, I returned to my role as Professor of Energy Policy in 2017. My most recent publications are in prestigious peer reviewed journals such as Energy Policy (2019) and Utilities Policy (2020) on the theme of offshore wind power.
3. As an author and co-author, I have an extensive publication record with my work focusing on the transition to 100% renewable energy in Scotland and the other countries that comprise the United Kingdom. I have edited three books and have also served as a journal Associate Editor. Further, I am an active member of several editorial boards. My work by invitation has been presented to the First Minister of Scotland, Holyrood, Edinburgh, Scotland and to Members of Parliament (MPs) of the United Kingdom Parliament, Westminster, London, England. I also receive regular invitations to present at academic and industry events on renewable energy issues. A full list of articles and presentations is available on request. I have also supervised to successful completion 18 doctoral students, with a number of these on renewable energy deployment, particularly in Africa.
4. My research on renewable energy has been funded by Innovate UK and the United Kingdom Economic and Social Research Council (ESRC). The research I work on in Scotland and Europe is very similar to the work on renewable energy published by Dr Jacobson in the context of the United States. Therefore, I have specific expertise to comment on the papers published by PNAS by Dr Jacobson et al. and Dr Clack et al. in 2015 and 2017, respectively. I am familiar with both papers and have spent some time re-reading and then re-evaluating them in the context of making this declaration.
5. I am aware that Dr Jacobson has initiated litigation against Dr Clack on the basis that the Dr Clack PNAS paper and resulting media coverage misrepresented the findings of Dr Jacobson's article and that this has had a detrimental impact on his professional reputation and wider standing in the public domain.
6. I have not been involved in the litigation and am not a co-author, of either of the papers relevant to this litigation. I have not published with Dr Jacobson or any of the authors of the Dr Clack et al. (2017) paper and have no professional association (joint research funding or PhD supervision) with these authors. Therefore, I am offering the following declaration in an independent capacity.
7. Dr Jacobson has requested my expert opinion and has asked me to comment on three issues raised by this case and these are set out in my declaration in points 10-13 below. However, my declaration has been extended to provide comment on related matters points 8 and 9 below which I think are important, and that the Court may consider of wider relevance.
8. As an expert with considerable experience of publishing, I am astonished that the Dr Clack et al. (2017) paper was published by PNAS as a research article. The PNAS publication guidelines are publicly available, with the Dr Clack et al. (2017) paper apparently contravening these guidelines, as there is no original research in the Dr Clack et al. (2017) paper, which in my perception must call into question the commissioning as well as the referee process for their paper. I am dismayed that the journal commissioning editor never identified this important point prior to sending the paper to referees. Furthermore, the referee process must also be called into question,

given the apparent errors by Dr Clack and his co-authors (which I comment on below) in the published version of their paper. If the court considers relevant and if it has not already done so, it should in my opinion request all email and other relevant correspondence from the PNAS on the commissioning process, the resulting referee process, decisions made on publication, and come to a view on how rigorous this overall process was.

9. It is my perception that Dr Jacobson has suffered significant loss of professional reputation and public standing following the publication of this paper and the media coverage that has followed. I have for example witnessed Dr Jacobson's work being unfairly mocked in social media outlets such as Twitter, with the Dr Clack et al. (2017) paper then cited as evidence that Dr Jacobson's work is in some way flawed (which in my expert opinion it is not). It is also my view that Dr Ken Caldeira (@KenCaldeira) continues to inflame this situation with recent social media posts such as that on 10th July 2020. Dr Caldeira has more than 24,000 Twitter followers. In the energy space this is a large following. The tweet in question was retweeted 95 times and liked 234 times. This tweet received numerous comments some of which I consider potentially defamatory towards Dr Jacobson, though that would be for a Court to decide.
10. More specifically Dr Jacobson has asked me to comment on three issues:
 - 10.1) Does Table 1 in the Dr Jacobson et al. paper (2015) contain maximum or average values?
 - 10.2) Did the Dr Jacobson et al. (2015) paper contain imported Canadian Hydro power as part of its results?
 - 10.3) Is there a modelling error in Dr Jacobson's Loadmatch computer code that he used in his (2015) paper?
11. From reading the Dr Jacobson et al. (2015) paper and diligently following up on sources contained within the paper – as a professionally qualified researcher would always do – it is clear that the answer to the question contained in 10.1 above is *average*, as correctly stated by Dr Jacobson. I am confused as to why Dr Clack and his co-authors made such a basic error. Furthermore, and as part of the referee process for the Dr Clack et al. (2017) paper, I am astonished that the Dr Clack et al. (2017) error was not identified by suitably qualified referees. There should be no scientific disagreement as to the question of *average*. This is a point of fact.
12. In answering the question in 10.2, the Dr Jacobson et al. (2015) paper contained *Canadian Hydro Power*, as correctly stated by Dr Jacobson. Therefore, I am again perplexed as to why Dr Clack and his co-authors made yet another basic error. Furthermore, and as part of the referee process for the Dr Clack et al. (2017) paper, I would have expected a robust editor and referee process to have identified their obvious errors. There should be no scientific disagreement as to the question of *Canadian Hydro Power*. This is another point of fact.
13. In answering the question in 10.3, I would need to defer to a modelling expert as this is beyond my specific area of expertise, but it would appear to me as a professionally qualified researcher with a PhD in mixed research methods, that Dr Clack et al. (2017) based their assumptions on an incorrect reading of the Jacobson et al. (2015) paper as noted above. There is no substantive evidence available that Dr Jacobson et al.'s (2015) paper contains any modelling errors, which I interpret to mean "computer bugs" and not poor assumptions given that there are separate sections for "Modelling Errors" and "Implausible Assumptions" in the Dr Clack et al. (2017) paper. The Dr Clack et al. (2017) analysis appears to be entirely speculative rather than based on scientific evidence and facts.
14. It is my view that Dr Clack et al. (2017) reached erroneous conclusions, which may have been confounded by both the commissioning of this piece, a lack of editor and

referee scrutiny during the review process, and further exacerbated by the fact that the inclusion of the Dr Clack et al. (2017) paper appears to contravene the Journal's own publication guidelines. As a matter of fact, the Dr Clack et al. (2017) paper is not a "Research Article" as generally defined by the scientific community and more specifically the journals own guidelines. In my view the Dr Clack et al. (2017) paper is no more than an extremely well written (in style, only) but very poorly researched opinion piece that lacks a robust reading of the Jacobson et al. (2015) paper, but yet it has been presented by PNAS as a "Research Article".

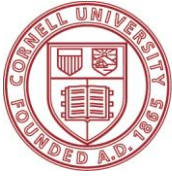
15. To conclude, I have also witnessed that Dr Jacobson has suffered significant loss of professional reputation and public standing following the publication of the Dr Clack et al. (2017) paper, and the media coverage that subsequently followed. At least one of co-authors of the Dr Clack et al. (2017) paper, as outlined above, continues to inflame this situation given continued social media posts which result in potentially defamatory comments being made against Dr Jacobson.

I declare under penalty of perjury that the following is true and correct. Executed on 10th August 2020.

A handwritten signature in black ink, reading "Peter A. Strachan". The signature is written in a cursive, slightly slanted style.

Signed: Professor Peter A. Strachan of 2 Henderson Park, Peterhead, Aberdeenshire, Scotland

Dated: 10th August 2020



July 19, 2021

To whom it may concern:

I write at the request of Prof. Mark Jacobson of Stanford to provide my expert opinion regarding the paper by Clack and others entitled "Evaluation of a proposal for reliable low-cost grid power with 100% wind, water and solar" that was published in 2017 in *PNAS*, doi:1073/pnas.1610381114. (the "Clack Paper"). Also at Prof. Jacobson's request, I submitted a declaration one year ago on July 20, 2021 on the Clack Paper for the court.

I have been a tenured faculty member at Cornell University, Ithaca, NY, since 1985. Since 1993, I have held an endowed position at Cornell as the *David R. Atkinson Professor of Ecology & Environmental Biology*. I have extensive experience in academic publishing. I am the author or co-author of over 200 papers, and these have been cited by others in the peer-reviewed literature more than 70,000 times. I am the Founding Editor of the academic journal *Biogeochemistry* and served as Editor-in-Chief of that journal from 1983 to 2004. I was also the Editor-in-Chief of the academic journal *Limnology & Oceanography* from 2014 to 2019. I served on the Committee on Ethics of the American Society for Limnology & Oceanography from 1992-1998. I served as President-Elect and then President of the Coastal & Estuarine Research Federation from 2005 to 2009, overseeing the publications and ethical issues of that professional society. And I have been a member of the Committee on Publication Ethics (COPE) since 2014. COPE "is a [nonprofit organization](https://en.wikipedia.org/wiki/Committee_on_Publication_Ethics) whose [mission](https://en.wikipedia.org/wiki/Committee_on_Publication_Ethics) is to define best practice in the [ethics](https://en.wikipedia.org/wiki/Committee_on_Publication_Ethics) of [scholarly publishing](https://en.wikipedia.org/wiki/Committee_on_Publication_Ethics) and to assist [editors](https://en.wikipedia.org/wiki/Committee_on_Publication_Ethics), [publishers](https://en.wikipedia.org/wiki/Committee_on_Publication_Ethics), etc. to achieve this." (https://en.wikipedia.org/wiki/Committee_on_Publication_Ethics).

I have previously collaborated with Prof. Jacobson and am a co-author of two papers with him published (Jacobson et al. 2013, *Energy Policy*; and Jacobson et al. 2014, *Energy*). Prof. Jacobson and I also have a new paper in press (Howarth & Jacobson, 2021, How green is blue hydrogen, *Energy Science & Engineering*).

I am aware of the litigation filed by Prof. Jacobson against Dr. Clack and others associated with the Clack Paper, but I am not a party to the litigation and had no participation with it other than filing the declaration for the court a year ago. Nor was I associated with the publication of the Clack Paper or the 2015 paper by Prof. Jacobson and others, also published in *PNAS*, that was the subject of the Clack Paper. I have, however, carefully reviewed both of these two papers.

Prof. Jacobson has asked that I address a series of questions regarding the Clack Paper.

1. “Is omitting data or changing the definition of data to the wrong definition an ‘interpretation or judgment of data’ or is it ‘not an interpretation/judgment of data but instead altering the factual definition of data’?”

In my professional opinion, the Clack Paper incorrectly took average values in a table from the Jacobson et al. paper and stated that these were maximum values. Further, the Clack Paper omitted that the hydropower production estimate in the Jacobson et al. paper included imported Canadian hydropower, and then based on this omission erroneously stated that the estimate of the Jacobson et al. paper was excessively high for hydropower. The Clack Paper then stated that Jacobson et al. had made a “modeling error,” when in fact the Clack Paper was simply mis-stating what Jacobson et al. had presented. The Clack Paper was not making informed “interpretation of judgement of data,” but rather was making changes to to the factual definition of the data and omitting information, and then interpreting/judging based on these altered and omitted data.

2. “Is an author who makes a factual mistake in a review of other people's work following due diligence or acting in reckless disregard for the truth or in bad faith?”

Again in my professional experience, and based on decades of involvement with the ethics of scientific publication, I believe that the Clack Paper was reckless. Due diligence would have demanded that Dr. Clack and his coauthors contact Prof. Jacobson for clarification before they submitted their manuscript to *PNAS*. Due diligence would also have required that Dr. Clack and coauthors correct their factual misinterpretation of the Jacobson et al. paper, and do so quickly once they became aware of their error. If they were aware before the paper was published, Dr. Clack and coauthors should have either withdrawn their manuscript or completely revise it so as not to perpetuate their error. If they only became aware of the error after publication in *PNAS*, they should have asked the journal to publish a correction, and perhaps an apology. Further, Prof. Jacobson informs me that one of the authors of the Clack Paper had earlier mentored a student who was a coauthor of the Jacobson et al. paper criticized by the Clack Paper, and that Dr. Clack and his coauthors did not inform this student of their criticism until after acceptance for publication of the Clack Paper. If true, this is highly unprofessional behavior, in my opinion.

3. “Is it standard practice in the sciences for authors of a paper to issue a correction to the paper AFTER publication if a material FACTUAL error is discovered in their paper?”

Yes, professional ethics require authors to publish a correction within a reasonable time after they discover an error with their work.

4. “Is it unethical or ethical for authors of a paper to REFUSE to issue a correction to their paper AFTER publication if a material FACTUAL error is discovered in their paper?”

Again, professional ethics require authors to publish a correction. Refusal to do so is unethical.

Please contact me if you would like to further explore these issues.

Sincerely,

A handwritten signature in black ink, reading "Robert W. Howarth". The signature is fluid and cursive, with the first name "Robert" and last name "Howarth" clearly legible.

Robert W. Howarth, Ph.D.
*David R. Atkinson Professor of Ecology
and Environmental Biology*

E309 Corson Hall
Cornell University
Ithaca, NY, 14853 USA

Tel: 607-280-9981
e.mail: howarth@cornell.edu
<http://www.eeb.cornell.edu/howarth/>



Environment & Governance Group
 School of Humanities & Languages
 Faculty of Arts, Design & Architecture
 UNSW Sydney
 Sydney NSW 2052, Australia

Phone (mobile): +61 402 940892

email: m.diesendorf@unsw.edu.au

Web: <https://research.unsw.edu.au/people/associate-professor-mark-diesendorf>

To whom it may concern,

**Re: Expert opinion on specific questions related to Clack et al. (2017) paper,
www.pnas.org/cgi/doi/10.1073/pnas.1610381114**

I am an Honorary Associate Professor at UNSW Sydney, formerly called the University of New South Wales. My PhD is in applied mathematics/theoretical physics. Previously, at various times before my nominal retirement in 2016, I was a Principal Research Scientist in Australia's national research organization, CSIRO; Professor of Environmental Science and Founding Director of the Institute for Sustainable Futures at University of Technology Sydney; Associate Professor and Deputy Director of the Institute of Environmental Studies at UNSW Sydney; and Education Program Leader of the Australian Cooperative Research Centre for Low Carbon Living. As an author or coauthor, I have published 79 peer-reviewed journal papers, three scholarly books, 38 scholarly book chapters and 13 peer-reviewed conference papers.

From 2011 to 2016 I was a senior researcher in a research program at UNSW Sydney that performed computer simulation modelling of the operation of the Australian National Electricity Market running entirely on renewable energy. I am co-author of several peer-reviewed journal papers on this particular topic. This research is similar to that conducted on the electricity systems of the United States of America by Dr Mark Jacobson. Therefore, I have expertise in the scientific issues discussed in Dr Jacobson's and Dr Clack's journal papers published in PNAS in 2015 and 2017 respectively. I have studied both papers.

On 4 August 2020, I wrote a Declaration concerning issues surrounding the Clack et al. paper in the context of the legal case between Dr Jacobson and Dr Clack. Since then, Dr Jacobson has asked me to provide my expert opinion on additional specific questions related to Dr Clack's paper and the actions of its authors. Below are the questions and my responses (in ***bold italic***), based on my expertise as a scientist and author in the same area of study as Dr Clack and Dr Jacobson.

1. Is omitting data or changing the definition of data to the wrong definition an "interpretation or judgment of data" or is it "not an interpretation/judgment of data but instead altering the factual definition of data" in the following four cases:

a) Changing the definition of values in a table from average to maximum values?

This is not an interpretation/judgment of data but instead is altering the factual definition of data.

b) Omitting the inclusion of Canadian hydropower from total hydropower production?

This is not an interpretation/judgment of data but instead is altering the factual definition of data.

c) Claiming authors made a “modeling error” after wrongly assuming that data values in a paper are maximum rather than average values?

This is not an interpretation/judgment of data but instead is altering the factual definition of data.

d) Claiming authors made a “modeling error” with respect to hydropower output after omitting the fact that computer model output both in the paper and externally available to all authors shows no mathematical computer modeling error?

This is not an interpretation/judgment of data but instead is altering the factual definition of data.

2. Is an author who makes a factual mistake in a review of other people's work following due diligence or acting in reckless disregard for the truth or in bad faith when he or she

a) Fails to request clarification from the authors before publication if he or she is uncertain about an issue in the paper?

Acting in disregard for the truth and in bad faith

b) Hides the publication from a student he or she mentored and is now criticizing, until after acceptance of the paper?

Acting in bad faith

c) Refuses to correct the factual mistake when informed about it, with evidence, before publication?

Acting in reckless disregard for the truth and in bad faith

d) Refuses to correct the factual mistake when informed about it, with evidence, after publication?

Acting in reckless disregard for the truth and in bad faith

3. Is it standard practice in the sciences for authors of a paper to issue a correction to the paper AFTER publication if a material FACTUAL error is discovered in their paper?

Yes

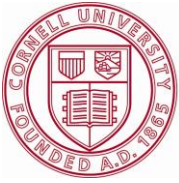
4. Is it unethical or ethical for authors of a paper to REFUSE to issue a correction to their paper AFTER publication if a material FACTUAL error is discovered in their paper and they are requested to make a correction?

It is unethical.

Yours sincerely,



Mark Diesendorf PhD
Honorary Associate Professor



Cornell University College of Engineering

School of Civil and
Environmental Engineering

220 Hollister Hall
Ithaca, NY 14853-3501

t. 607-255-3438

f. 607-255-9004

E-mail: civil_env_eng@cornell.edu

Web: www.cce.cornell.edu

July 20, 2021

To Whom It May Concern:

My name is Dr. Anthony R. Ingraffea. I am the Dwight C. Baum Professor of Engineering, Emeritus, at Cornell University and a Distinguished Member of the American Society of Civil Engineers. I am author or co-author of over 250 peer-reviewed technical publications, including papers in the PNAS. I have been a Co-Editor-In-Chief of a peer-reviewed journal, *Engineering Fracture Mechanics*, for over 15 years. I have authored or co-authored papers related to the ongoing national energy transition, including papers co-authored by Prof. Mark Jacobson.

I am aware of the litigation filed by Dr. Jacobson and certain claims related to certain of his papers published in the PNAS. I have thoroughly studied a related paper, *Evaluation of a proposal for reliable low-cost grid power with 100% wind water and solar*, PNAS, doi:1073/pnas.1610381114, 2017 (hereafter, the "Clack paper"). I am not a co-author of any of those papers, and I am commenting on them herein as an independent scholar.

On July 22, 2020, I wrote a Declaration requested by Prof. Jacobson about the Clack paper. Prof. Jacobson has now requested that I provide an expert opinion on additional questions related to that paper. Below are his questions and my answers to them:

1. Is omitting data, or changing the definition of data to the wrong definition an "interpretation or judgment of data", or is it "not an interpretation/judgment of data but instead altering the factual definition of data" in the following four cases:

a) Changing the definition of values in a table from average to maximum values?

My answer: This is clearly an instance of altering the factual definition of data.

b) Omitting the inclusion of Canadian hydropower from total hydropower production?

My answer: This is clearly another instance of apparently purposeful obscuring of the factual definition of data.

c) Claiming authors made a "modeling error" after wrongly assuming that data values in a paper are maximum rather than average values?

My answer: This is an instance where authors of the Clack paper made an incorrect inference about the model based on their own altering and obscuring of factual data.

d) Claiming authors made a "modeling error" with respect to hydropower output after omitting the fact that computer model output both in the paper and externally available to all authors shows no mathematical computer modeling error?

My answer: The unsupported inference of "modeling error" should have been obvious to the authors had they thoroughly checked for mathematical computer modeling error.

2. Is an author who makes a factual mistake in a review of other people's work following due diligence or acting in reckless disregard for the truth or in bad faith when he or she:

a) Fails to request clarification from the authors of the reviewed paper before publication if he or she is uncertain about an issue in the paper?

My answer: In this instance authors are not following due diligence expected from reviewers of scientific papers.

b) Hides the publication from a student he or she mentored and is now criticizing, until after acceptance of the paper?

My answer: This is an instance of reckless disregard for the ethics of peer-reviewed publication.

c) Refuses to correct the factual mistake when informed about it, with evidence, before publication?

My answer: This is an instance of reckless disregard for the truth.

d) Refuses to correct the factual mistake when informed about it, with evidence, after publication?

My answer: This is an instance of reckless disregard for the truth.

3. Is it standard practice in the sciences for authors of a paper to issue a correction to the paper AFTER publication if a material FACTUAL error is discovered in their paper?

My answer: Yes, definitely.

4. Is it unethical or ethical for authors of a paper to REFUSE to issue a correction to their paper AFTER publication if a material FACTUAL error is discovered in their paper?

My answer: It is unethical.

Thank you for your attention to this matter.

A handwritten signature in black ink, appearing to read 'A. R. Ingraffea', with a long, sweeping horizontal line extending to the right.

A. R. Ingraffea

Statement by Professor Peter A. Strachan

1. My name is Peter Anderson Strachan. I am over 18 years of age and am competent to make the following declaration.
2. I have been an academic member of staff at the Robert Gordon University, Aberdeen, Scotland, since 1993. I am currently Professor of Energy Policy at the Aberdeen Business School. I was appointed Professor of Energy Policy in 2009 and subsequently appointed in 2010 to the role of Group Lead for Strategy and Policy, responsible for a research and teaching group of approximately 20 full-time and part-time academic staff. Following University re-organisation, I returned to my role as Professor of Energy Policy in 2017. My most recent publications are in prestigious peer reviewed journals.
3. As an author and co-author, I have an extensive publication record with my work focusing on the transition to 100% renewable energy in Scotland and the other countries that comprise the United Kingdom. I have edited three books and have also served as a journal Associate Editor. Further, I am an active member of five journal editorial boards. My work by invitation has been presented to the First Minister of Scotland, Holyrood, Edinburgh, Scotland. And to Members of Parliament (MPs) of the United Kingdom Parliament, Westminster, London, England. I also receive regular invitations to present at academic and industry events on renewable energy issues. A full list of articles and presentations is available on request. I have also supervised to successful completion 20 doctoral students, with a number of these on renewable energy deployment, particularly in Africa.
4. My research on renewable energy has been funded by Innovate UK and the United Kingdom Economic and Social Research Council (ESRC). The research I work on in Scotland and Europe is very similar to the work on renewable energy published by Dr Jacobson in the context of the United States. Therefore, I have specific expertise to comment on the papers published by PNAS by Dr Jacobson et al. and Dr Clack et al. in 2015 and 2017, respectively. I am familiar with both papers and have spent some time re-reading and then re-evaluating them in the context of making this statement.
5. I am aware that Dr Jacobson had initiated litigation against Dr Clack on the basis that the Dr Clack PNAS paper and resulting media coverage misrepresented the findings of Dr Jacobson's article. And further that this has had a detrimental impact on his professional reputation and wider standing in the public domain.
6. I am not a co-author, of either of the papers. I have not published with Dr Jacobson or any of the authors of the Dr Clack et al. (2017) paper and have no professional association (joint research funding or PhD supervision) with these authors. Therefore, I am offering the following statement in an independent capacity.
7. On the August 10th, 2020, I wrote a Court Declaration (available on request) requested by Dr Jacobson about the Clack paper. Dr Jacobson has now requested that I provide an expert opinion on additional questions related to that paper. Below are his questions and my answers to them:
 1. Is omitting data or changing the definition of data to the wrong definition an "interpretation or judgment of data" or is it a "factual error" in the following four cases:
 - a) Changing the definition of values in a table from average to maximum values?
My Answer: This is an instance of altering the factual definition of data. With erroneous conclusions then arising. It is my perception that changing the definition of data in this way amounts to reckless / poor scholarship.
 - b) Omitting the inclusion of Canadian hydropower from total hydropower production?
My Answer: This is a further instance of altering the factual definition of data. It is my perception that the Clack paper made a reckless error in this respect. With erroneous conclusions then arising.

c) Claiming authors made a "modeling error" after wrongly assuming that data values in a paper are maximum rather than average values?

My Answer: The Clack paper makes spurious claims in this respect. There is no evidence of "modelling errors". It is my perception that this is an example of poor scholarship.

d) Claiming authors made a "modeling error" with respect to hydropower output after omitting the fact that computer model output both in the paper and externally available to all authors shows no mathematical computer modeling error?

My Answer: The Clack paper again makes spurious claims in this respect. There is no evidence of "modelling errors". It is my perception that this is an example of reckless or rash scholarship.

2. Is an author who makes a factual mistake in a review of other people's work following due diligence or acting in reckless disregard for the truth or in bad faith when he or she

a) Fails to request clarification from the authors before publication if he or she is uncertain about an issue in the paper?

My Answer: When criticising in a significant way an author's paper it is accepted custom and practice to seek clarification on the issue or issues of uncertainty or issues that are in dispute. Such criticisms may involve factual issues contained within a paper, or issues of a substantial nature related to the philosophical approach or methodology employed by an author. Failure to seek clarification from an author, especially where there is a significant rebuttal of a paper would amount to acting in disregard of the truth.

b) Hides the publication from a student he or she mentored and is now criticizing, until after acceptance of the paper?

My Answer: A situation like this is almost inconceivable. The mentor is clearly acting in bad faith and is being dishonest. And worse actively (intentionally or unintentionally) working to discredit their mentee. Professional ethics and accepted practice would dictate that the mentor be fully open and transparent in all interactions with a mentee. Clearly the mentor if he/she had concerns regarding a student's published or other work should have highlighted this as part of the mentee process. And clearly explained this to the mentee so that the mentee could avoid making such a mistake in the future. This standard would apply to both current and former mentoring relationships. In my view a mentor hiding publication activity from their mentees (current or former) where criticisms are being made of the mentee is clearly an act of poor judgement, with this potentially even amounting to gross misconduct, but that would be for an investigation committee to ultimately determine.

c) Refuses to correct the factual mistake when informed about it, with evidence, before publication?

My Answer: This is clearly unethical behaviour and in contravention of accepted academic norms and values. It is fundamentally dishonest. My perception is that this amounts to gross misconduct, though again that would be for an investigation committee to determine.

d) Refuses to correct the factual mistake when informed about it, with evidence, after publication?

My Answer: It would be dishonest for authors not to correct a mistake, when evidence is presented that an error has been made. Once again it is my perception that this amounts to an act of gross misconduct, though again that would be for an investigation committee to determine.

3. Is it standard practice in the sciences for authors of a paper to issue a correction to the paper AFTER publication if a material FACTUAL error is discovered in their paper?

My Answer: Professional ethics and accepted practice dictates that authors should issue a proportionate correction, with an explanation, and within a reasonable timeframe after the discovery of a significant error that has been made in a published output. I would go further and state that when such an error is detected that the author (or, for that matter a whistle blower) should then refer the work to the Head of Faculty and consequently for there to be an investigation undertaken to determine the context, circumstances and to determine if any penalties should arise. Following an investigation process there is precedent in the academic community that when an author has acted recklessly or in bad faith that, that author should then request that their paper be withdrawn from the public domain, with an appropriate explanation given of the circumstances. In my view the Clack paper would fall under this category, and it should be retracted.

4. Is it unethical or ethical for authors of a paper to REFUSE to issue a correction to their paper AFTER publication if a material FACTUAL error is discovered in their paper?

My Answer: It is my perception that it is unethical for authors to refuse to issue a correction when clear errors are apparent in their paper, as is the case with the Clack paper. In my view, as outlined above professional ethics dictate that the Clack paper should be retracted. This would correct the record for all concerned and further avoid potentially reputational damage to an academic and his employer.

Signed: Professor Peter A. Strachan of 2 Henderson Park, Peterhead, Aberdeenshire, Scotland

Dated: 3rd September 2021

Peter A. Strachan

The United States can keep the grid stable at low cost with 100% clean, renewable energy in all sectors despite inaccurate claims

Mark Z. Jacobson^{a,1}, Mark A. Delucchi^b, Mary A. Cameron^a, and Bethany A. Frew^a

The premise and all error claims by Clack et al. (1) in PNAS, about Jacobson et al.'s (2) report, are demonstrably false. We reaffirm Jacobson et al.'s conclusions.

False Premise

Clack et al.'s (1) premise that deep decarbonization studies conclude that using nuclear, carbon capture and storage (CCS), and bioenergy reduces costs relative to "other pathways," such as Jacobson et al.'s (2) 100% pathway, is false.

First Clack et al. (1) imply that Jacobson et al.'s (2) report is an outlier for excluding nuclear and CCS. To the contrary, Jacobson et al. are in the mainstream, as grid stability studies finding low-cost up-to-100% clean, renewable solutions without nuclear or CCS are the majority (3–16).

Second, the Intergovernmental Panel on Climate Change (IPCC) (17) contradicts Clack et al.'s (1) claim that including nuclear or CCS reduces costs (7.6.1.1): "...high shares of variable RE [renewable energy] power...may not be ideally complemented by nuclear, CCS,..." and (7.8.2) "Without support from governments, investments in new nuclear power plants are currently generally not economically attractive within liberalized markets..." Similarly, Freed et al. (18) state, "...there is virtually no history of nuclear construction under the economic and institutional circumstances that prevail throughout much of Europe and the United States," and Cooper (19), who compared decarbonization scenarios, concluded, "Neither fossil fuels with CCS or nuclear power enters the least-cost, low-carbon portfolio."

Third, unlike Jacobson et al. (2), the IPCC, National Oceanic and Atmospheric Administration, National Renewable Energy Laboratory, and International Energy Agency have never performed or reviewed a cost analysis of grid stability under deep decarbonization. For example, MacDonald et al.'s (20) grid-stability analysis considered only electricity, which is only ~20% of total energy, thus far from deep decarbonization. Furthermore, deep-decarbonization studies cited by Clack et al. (1) have never analyzed grid stability. Jacobson

et al. (2) obtained grid stability for 100% wind, water, and solar power across all energy sectors, and thus simulated complete energy decarbonization.

Fourth, Clack et al.'s (1) objectives, scope, and evaluation criteria are narrower than Jacobson et al.'s (2), allowing Clack et al. (1) to include nuclear, CCS, and biofuels without accounting for their true costs or risks. Jacobson et al. (2, 21) sought to reduce health, climate, and energy reliability costs, catastrophic risk, and land requirements while increasing jobs. Clack et al. (1) focus only on carbon. By ignoring air pollution, the authors ignore bioenergy, CCS, and even nuclear health costs (22); by ignoring land use they ignore bioenergy feasibility; by ignoring risk and delays, they ignore nuclear feasibility, biasing their conclusions.

Fifth, Clack et al. (1) contend that Jacobson et al. (2) place "constraints" on technology options. In contrast, Jacobson et al. include many technologies and processes not in Clack et al.'s (1) models. For example, Jacobson et al. (2) include, but MacDonald et al. (20) exclude, concentrated solar power (CSP), tidal, wave, geothermal, solar heat, any storage (CSP, pumped-hydro, hydropower, water, ice, rocks, hydrogen), demand-response, competition among wind turbines for kinetic energy, electrification of all energy sectors, calculations of load decrease upon electrification, and so forth. Model time steps in MacDonald et al. (20) are also 120-times longer than in Jacobson et al. (2).

False Error Claims

Clack et al. (1) claim wrongly that Jacobson et al. (2) assume a maximum hydropower output of 145.26 GW, even though table S2 in Jacobson et al. shows 87.48 GW. Clack et al. (1) then claim incorrectly that the 1,300 GW drawn in figure 4B of Jacobson et al. (2) is wrong because it exceeds 87.48 GW, not recognizing that 1,300 GW is instantaneous and 87.48 GW, a maximum possible annual average [table S2, footnote 4 in Jacobson et al. (2) and the available LOADMATCH code]. The value of 1,300 GW is correct, because turbines were

^aDepartment of Civil and Environmental Engineering, Stanford University, Stanford, CA 94305; and ^bInstitute of Transportation Studies, University of California, Berkeley, CA 94720

Author contributions: M.Z.J. and M.A.D. designed research; M.Z.J., M.A.D., M.A.C., and B.A.F. performed research; M.Z.J. and M.A.D. contributed new reagents/analytic tools; M.Z.J. and M.A.D. analyzed data; and M.Z.J., M.A.D., M.A.C., and B.A.F. wrote the paper.

The authors declare no conflict of interest.

¹To whom correspondence should be addressed. Email: jacobson@stanford.edu.

assumed added to existing reservoirs to increase their peak instantaneous discharge rate without increasing their annual energy consumption, a solution not previously considered. Increasing peak instantaneous discharge rate was not a “modeling mistake” but an assumption consistent with Jacobson et al.’s (2) table S2, footnote 4, and LOADMATCH, and written to Clack on February 29, 2016.

Jacobson et al. (2) only neglect the cost of additional turbines, generators, and transformers needed to increase the maximum discharge rate. Such estimated cost for a 1000-MW plant (23) plus wider penstocks is ~\$385 (325–450)/kW, or ~14% of hydropower capital cost. When multiplied by the additional turbines and hydropower’s fraction of total energy, the additional infrastructure costs ~3% of the entire wind, water, and solar power system and thus doesn’t impact Jacobson et al.’s (2) conclusions. Increasing CSP’s—instead of hydropower’s—peak discharge rate also works.

In their figure 3, Clack et al. (1) then claim mistakenly that Jacobson et al.’s (2) annual hydropower energy output is 402 TWh/yr and too high, when it is actually 372 TWh/yr because they missed transmission and distribution losses. This is less than half the possible United States hydropower output today and well within reason.

Clack et al. (1) next claim wrongly that in Jacobson et al.’s (2) table 1, loads are “maximum possible” loads, even though the text clearly indicates they are annual-average loads. The word “maximum” is never used. Clack et al. (1) compound this misrepresentation by claiming flexible loads in Jacobson et al.’s (2) time figures are twice “maximum possible” loads, even though Jacobson et al. clearly state that the annual loads are distributed in time.

Unsubstantiated Claims About Assumptions. Clack et al. (1) assert that underground thermal energy storage (UTES) can’t be expanded nationally, but we disagree. UTES is a form of district heating, which is already used worldwide (e.g., 60% of Denmark); UTES is technologically mature and inexpensive; moreover, hot-water storage or heat pumps can substitute for UTES. Similarly, molten salt can substitute for phase change materials in CSP storage.

Clack et al. (1) further criticize Jacobson et al.’s (2) hydrogen scale-up, but this is easier than Clack et al.’s (1) proposed nuclear or CCS scale-up. Clack et al. (1) also question whether aviation can adopt hydrogen, but a 1,500-km range, four-seat hydrogen fuel cell plane already exists, several companies are now designing electric-only planes for up to 1,500 km, and Jacobson et al. (21) propose aircraft conversion only by 2035–2040.

Clack et al. (1) question whether industrial demand is flexible, yet the National Academy of Sciences (24) review they cite states, “Demand response can be a lucrative enterprise for industrial customers.”

Clack et al. (1) criticize Jacobson et al.’s (2) use of a 1.5–4.5% discount rate, even though that figure is a well-referenced social discount rate for a social cost analysis of an intergenerational project (21).

Clack et al. (1) state misleadingly that Jacobson et al.’s (2) storage capacity is twice United States electricity capacity, failing to acknowledge that Jacobson et al.’s (2) report treats all energy, which is five times electricity, not just electricity, and in Jacobson et al. (2), storage is only two-fifth of all energy. Furthermore, in Jacobson et al.’s (2) report, storage is mostly heat.

Clack et al. (1) claim the average installed wind density is 3 W/m², but fail to admit this includes land for future project expansion and double counts land where projects overlap. Furthermore, real data from 12 European and Australian farms give 9.4 W/m².

Clack et al. (1) claim that Jacobson (22) didn’t rely on consensus data for CO₂ lifecycle estimates, although Jacobson’s nuclear estimate was 9–70 g-CO₂/kWh, within the IPCC’s (17) range, 4–110 g-CO₂/kWh.

Clack et al. (1) claim falsely that Jacobson (22) didn’t include a planning-to-operation time for offshore wind, even though ref. 22 states 2–5 y.

Clack et al. (1) criticize Jacobson (22) for considering weapons proliferation and other nuclear risks, although the IPCC (17) agrees (Executive Summary): “Barriers to and risks associated with an increasing use of nuclear energy include operational risks and the associated safety concerns, uranium mining risks, financial and regulatory risks, unresolved waste management issues, nuclear weapons proliferation concerns, ... (robust evidence, high agreement).”

False Model Claims. Clack et al. (1) claim falsely that the gas, aerosol, transport, radiation-general circulation mesoscale, and ocean model (GATOR-GCMOM) “has never been adequately evaluated,” despite it taking part in 11 published multimodel intercomparisons and 20 published evaluations against wind, solar, and other data; despite Zhang’s (25) evaluation that GATOR-GCMOM is “the first fully-coupled online model in the history that accounts for all major feedbacks among major atmospheric processes based on first principles”; and despite hundreds of processes in it still not in any other model (26).

Clack et al. (1) contend that LOADMATCH is not transparent, even though LOADMATCH has been publicly available since Jacobson et al.’s (2) publication.

Clack et al. (1) criticize LOADMATCH for not treating power flows, and claim that Jacobson et al.’s (2) transmission costs are “rough.” However Clack et al. (1) do not show such costs are unreasonable or acknowledge Jacobson et al.’s (2) high-voltage direct current cost per kilometer (21) are far more rigorous than MacDonald et al.’s (20).

Finally, Clack et al. (1) falsely claim that LOADMATCH has perfect foresight, thus is deterministic. However, LOADMATCH has zero foresight, knowing nothing about load or supply the next time step. It is prognostic, requiring trial and error, not an optimization model.

In sum, Clack et al.’s (1) analysis is riddled with errors and has no impact on Jacobson et al.’s (2) conclusions.

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Subject: Where we agree – authors of Jacobson et al (2015) and Clack et al. (2017)

From: Chris Field <cfield@stanford.edu>

Date: 6/26/17, 8:08 AM

To: "MaryACameron@gmail.com" <MaryACameron@gmail.com>, "Bethany.Frew@nrel.gov" <Bethany.Frew@nrel.gov>, "madelucchi@berkeley.edu" <madelucchi@berkeley.edu>, Mark Z Jacobson <jacobson@stanford.edu>, "chrisclack84@gmail.com" <chrisclack84@gmail.com>, "staffanq@gmail.com" <staffanq@gmail.com>, "apt@cmu.edu" <apt@cmu.edu>, "mbazilian@worldbank.org" <mbazilian@worldbank.org>, Adam Brandt <abrandt@stanford.edu>, "kcaldeira@carnegiescience.edu" <kcaldeira@carnegiescience.edu>, "sjdavis@uci.edu" <sjdavis@uci.edu>, "victor.diakov@omniopitimum.com" <victor.diakov@omniopitimum.com>, "mark.handschy@gmail.com" <mark.handschy@gmail.com>, "paul.hines@uvm.edu" <paul.hines@uvm.edu>, "pjaramil@andrew.cmu.edu" <pjaramil@andrew.cmu.edu>, "kammen@berkeley.edu" <kammen@berkeley.edu>, "janecslong@gmail.com" <janecslong@gmail.com>, "granger.morgan@andrew.cmu.edu" <granger.morgan@andrew.cmu.edu>, "Adam.Reed@colorado.edu" <Adam.Reed@colorado.edu>, "VSivaram@cfr.org" <VSivaram@cfr.org>, "jim.sweeney@stanford.edu" <jim.sweeney@stanford.edu>, "gtynan@eng.ucsd.edu" <gtynan@eng.ucsd.edu>, "david.victor@ucsd.edu" <david.victor@ucsd.edu>, John P Weyant <weyant@stanford.edu>, "whitacre@cmu.edu" <whitacre@cmu.edu>

Dear Colleagues,

As you know, Jacobson et al. (2015) and Clack et al. (2017) differ substantially in approach, results, and interpretation. But both papers start from the understanding that climate change is real and important and that efforts to address it need to be accelerated.

I share the concern that many of you have expressed, that our common foundation of understanding might be obscured by focusing on how the papers differ. To manage the risk that some stakeholders lose sight of the shared understanding, I have been working with Ken Caldeira and Mark Jacobson to draft a brief statement on the common foundation. Both Mark and Ken have approved the wording of the statement below. I encourage all of you to support it as well. Unfortunately, there are too many of you for this to go through a mass edit, so your option is to opt in or opt out. The plan is that this statement, with sign-on from all of you who choose to join, can be used to make it clear that the area of shared understanding is large, important, and more than sufficient as a basis for accelerated action. The statement can be posted on web sites, shared with journalists, and incorporated into other communications.

The statement is:

**

Where we agree

We agree that there is an urgent need to transition to a near-zero emission energy economy in all energy sectors as fast as possible. This involves reducing energy use, employing energy efficiency measures, and electrifying most energy end-use, with electricity provided as much as is practical by emission-free sources.

We agree that policies should be put in place now to encourage widespread deployment of available near-zero emission technologies. Questions of the details of the end of transition are of secondary importance relative to the agreement that the transition needs to start now with technologies that we can deploy today.

**

Please let me know if you would like to sign on to the statement above. It would be great to have all or nearly all authors of both papers on the list.

Thanks,
Chris

Christopher Field

Perry L. McCarty Director

Stanford Woods Institute for the Environment

Creating Practical Solutions for People and the Planet

cfield@stanford.edu

+1 (650) 736 4352

<https://woods.stanford.edu>

IN THE SUPERIOR COURT
FOR THE DISTRICT OF COLUMBIA

EXHIBIT 15

MARK Z. JACOBSON, Ph.D.,	)	
	)	
Plaintiff,	)	
	)	
v.	)	C. A. No. 2017 CA 006685 B
	)	Judge Elizabeth Wingo
	)	Next Court Event: None Scheduled
CHRISTOPHER T. M. CLACK, Ph.D.,	)	
	)	
and	)	
	)	
NATIONAL ACADEMY OF SCIENCES	)	
	)	
Defendants.	)	

**PLAINTIFF MARK Z. JACOBSON'S
MOTION FOR RELIEF FROM A JUDGMENT AND TO ALTER A JUDGMENT**

INTRODUCTION

Plaintiff Mark Z. Jacobson, Ph.D. ("Plaintiff"), pursuant to Rules 60(b)(3), 60(b)(2), and 60(b)(1) (Relief from a Judgment due to misrepresentation by an opposing party, newly discovered evidence, and mistake in fact and law, respectively); and pursuant to Rule 59(e) (Motion to alter or amend a judgment), submits this motion to vacate the Court's final judgment of September 13, 2021, granting Attorney's Fees and Costs to Defendant Dr. Chris Clack. In its June 6, 2020, Order, the Court stated that Rules 59 and 60 are applicable to a final judgment.

The five main reasons for vacating the judgment are

1) NAS and Dr. Clack provided a fake meaning of the term "*scientific disagreement*" to the Court, which the Court adopted, causing an incorrect and unjust decision. A "*scientific disagreement*" is the development of different theories and conclusions from existing data of

known definition. It is impossible for what occurred here to be a “*scientific disagreement*.” Instead, the Clack Authors and NAS changed the provable definition of data (made up data) and omitted data so that data are not accurately reflected in the research record. When done “*recklessly*” and in “*departure from accepted practices*,” as they did (see #3), these acts are data “*fabrication*” and “*falsification*,” respectively, per U.S. definitions governing research (65 Fed Register 76262).

2) Four independent, unpaid expert scientists (Exhibits 1-8) confirm this false definition and declare that Dr. Clack and NAS published false facts, NOT “*scientific disagreements*,” because they changed the meaning of data and omitted data and then made factually false claims of error based on their own errors, damaging Plaintiff. Thus, the Court ruling that “*three asserted egregious errors*” are “*statements reflecting scientific disagreements*” is a clear error of fact.

3) Because the Clack Authors failed to consult the Jacobson Authors about uncertainties (which is standard practice) and refused to correct factual errors after being informed about them before and after publication (standard practice), the experts also declare (Exhibits 5-8) the errors were “*dishonest*,” “*in bad faith*,” “*with reckless disregard for the truth*,” “*unethical*,” “*contrary to standard practice*,” and/or made while “*failing to follow due diligence*.” Thus, they were “*reckless*” and a “*departure from accepted practice*,” NOT “*honest errors*” or mere “*mistakes*.”

4) Washington D.C. law does not require an accusation of misconduct or of dishonesty to prove defamation. Defamation also arises when a statement injures a person in their trade or occupation or makes them appear odious, infamous, or ridiculous. Statements can also be implicit. Thus, the present case is a defamation case.

5) A Court must give Plaintiff the benefit of the doubt and may dismiss his defamation claim (as done here to justify fees) only when there is “*no set of facts in support of his claim which would entitle him to relief*” (*Oparaguo v. Watts*, 884, A.2d 63, 76, D.C. 2005). Multiple sets of

facts support Plaintiff's case. But here, the Court used a wrong meaning of "*scientific disagreement*," ignored Defendants' bad-faith refusals to correct errors (ignoring their intention), then used a narrow meaning of a defamatory statement, giving Defendants the benefit of the doubt.

Three of the reasons above are due to clear errors of fact and two, to errors of law. "*Clear error*" is a basis for reversing a ruling (*Husain v. Olympic Airways*, 316 F.3d 829, 835, 9th Cir. 2002). The first error is proven with the true definitions of the terms "*scientific disagreement*," "*falsification*," and "*fabrication*," and expert opinion. The others are confirmed by the experts.

In *Dist. No. 1 v. Travelers Casualty*, 782 A.2d 269, 278, D.C. 2001, the Court stated that "*neither Rule 59(e) nor Rule 60(b) is designed 'to enable a party to complete presenting [its] case after the court has ruled against [it].'*" There, though, a trial was held. No discovery or trial occurred here because Plaintiff voluntarily dismissed his case without prejudice before either. There, the Court also stated a party may show "*good reason*" more information should be allowed. It even suggested one reason is "*incomplete discovery*," stating, "*It did not assert, for example, that incomplete discovery had prevented it...*" Discovery here was incomplete since none was held, suggesting new evidence can be considered. Six more reasons to allow new evidence are

(1) The evidence vindicates Prof. Jacobson, and truth and honesty should prevail over technicalities, clear errors of fact, and the fake definition of a crucial term provided by Defendants that was then adopted as a key justification in the April 20, 2020, Court Order.

(2) The claim by NAS and Dr. Clack, with no independent confirmation, that fake and omitted facts are "*scientific disagreements*," is such a reckless or intentional misrepresentation causing Court Orders against Plaintiff, that justice requires an independent analysis of the claim.

(3) In a case dismissing a claim for defamation, which this is, the Court must give the benefit of the doubt to the Plaintiff:

“In reviewing an order dismissing a claim for defamation, we continue to adhere to the standard of whether, construing the complaint in the light most favorable to the plaintiff, ‘it appears beyond doubt that [plaintiff] can prove no set of facts in support of his claim which would entitle him to relief.’” Oparaguo v. Watts, 884, A.2d 63, 76, D.C. 2005, (citing cases).

By clarifying existing evidence with expert testimony, Plaintiff proves here beyond a doubt that his factual assertions were not only possible, but exactly correct. As such, multiple sets of facts support Plaintiff’s defamation claim, thus no justification exists for charging him fees.

(4) There is no way that Prof. Jacobson could have known the Court would develop a new interpretation of law, not previously existing in Washington D.C. and based on a different state’s law, to justify taxing Prof. Jacobson for legal fees after his voluntary dismissal and before the April 20, 2020, legal fee decision. Thus, he could not have known he would need new factual evidence (instead of legal arguments) to bolster his case after his dismissal and before the decision.

(5) Because this is not a case like in *Dist. No. 1 v. Travelers* that involved a trial, the opportunities for presenting third-party evidence here were limited.

(6) The Court allowed and even commented on the May 26, 2020 Declaration of Dr. Ken Caldeira (co-author on the Clack Paper) in its June 25, 2020 Order even though Dr. Caldeira’s Declaration was submitted after the Order of April 20, 2020. Fairness suggests the allowance of the present Declarations, which clarify evidence and completely vindicate Prof. Jacobson.

The three factual and two legal bases for vacating the orders are summarized as follows.

(1) **New clarifications from scientists prove clear errors of fact.** Four unpaid, independent expert scientists declare absolutely (Exhibits 1-8) that the three “*egregious errors*” by the Clack Authors are provable issues of fact, NOT scientific disagreements, and the facts are false. They also declare that the Clack Authors then “*made an incorrect inference about the model based on their own altering and obscuring of factual data*”(Exhibit 7). They further state that the false facts and omitted data and the resulting false factual claims of modeling error caused Prof. Jacobson

“significant loss of professional reputation and public standing” (Exhibit 4). **Their analysis then indicates that Dr. Clack and NAS provided a fake meaning of the term “scientific disagreement”** to the Court. Because Dr. Clack is a scientist and NAS is a scientific body, and this is such a basic term known to virtually all scientists, both should know their definition was fake. As such, their making this claim to the Court is reckless or intentional misrepresentation. The fake definition of the term *“scientific disagreement”* was then used by the Court to justify its decision, causing the ruling to be based on a fake definition rather than on the true definition and on what occurred, which was data fabrication (changing the meaning of, thus altering, data) and falsification (omitting data). Because the Clack Authors failed to seek clarification and refused to correct their errors when asked, the experts also declare that the Clack Author factual errors were made *“dishonest(ly),” “in bad faith,” “with reckless disregard for the truth,” “unethical(ly),” “contrary to standard practice in the field,”* and/or while *“failing to follow due diligence.”*

(2) **Errors of Law.** Washington D.C. Defamation Law absolutely does not require an accusation of misconduct or an attack on someone’s honesty as proof of defamation, as incorrectly claimed in the April 20, 2020 Court Order (at 24-25): *“they simply do not attack Dr. Jacobson’s honesty or accuse him of misconduct.”* Defamation equally arises when a statement injures a person in their trade or occupation or makes a person appear *“odious, infamous, or ridiculous.”* Also, a statement that causes injury does not even need to be stated explicitly. **It may be implied.**

Because of clear errors of fact and legal errors, the Court ruled Prof. Jacobson’s Defamation case would not have *“succeeded on the merits”* (D.C. Code 16-5502) thus Prof. Jacobson should be liable for attorney’s fees and costs under the anti-SLAPP statute. A correction of the clear errors of fact and legal errors would mean that Prof. Jacobson’s defamation case would likely succeed on its merits. At a minimum, he provides enough factual evidence that it is impossible to state

there is “*no set of facts in support of his claim which would entitle him to relief.*” (*Oparaguo v. Watts*, 884, A.2d 63, 76, D.C. 2005). Thus, the Court is requested to vacate its order for legal fees.

FACTS

Declarations from four independent, unpaid expert senior scientists from three continents, are provided: Prof. Howarth (Cornell Univ., US); Prof. Diesendorf (UNSW Sydney, Australia); Prof. Ingrassia (Cornell Univ., US); and Prof. Strachan (Robert Gordon Univ., Scotland). The experts have, combined, over 100 years of research and publishing experience, including in the area of the Clack and Jacobson Papers. All are familiar with the papers (bios, Exhibits 1-8). Howarth has been a member of the Committee on Publication Ethics (COPE) since 2014. COPE’s mission is “*to define best practice in the ethics of scholarly publishing...*” (Exhibit 5).

Federal Rule of Evidence 702 governs the qualifications of experts in Washington D.C. (*Motorola Inc., et al. v. Michael Patrick Murray, et al.*, 2016 WL 6134870; 2016). Based on the rule and its four criteria, all four experts should qualify. (a) All four specifically address critical factual issues in their reports in far more detail than provided by either Dr. Clack or NAS. (b) All four provide testimony on facts and data from two Jacobson Papers and/or the Clack Paper. (c) All four provide testimony based on reliable principles and method, such as invoking standard practice in the field. (d) All four independently arrive at the same conclusions based on their methods.

As an example of how the experts meticulously arrive at their decisions, consider Prof. Diesendorf, who (Exhibit 2) first defines the difference between a “*fact*” and a “*scientific disagreement*.” He then states why he believes Table 1 of the Jacobson Paper contains average values (as claimed by Prof. Jacobson) rather than maximum values (as claimed Dr. Clack and NAS) and why that is an error of fact by Dr. Clack and NAS:

“As a scientist, I understand that a fact is something that has either been proven to be true or is true by definition or logical argument. The following are examples of facts:...”

“As a scientist, I understand that a scientific disagreement can occur when we have incomplete information about the system of interest and different scientific hypotheses can be held that are consistent with the available data, logic and existing scientific facts.”

“I wish to emphasize that disagreement between scientists is not always the same as ‘scientific disagreement’. For example, ...”

“My assessment is that Question 11.1 is a question of fact that I have verified from studying both the Jacobson PNAS paper itself and its reference 22 (also by Jacobson), which is the source of the data in Table 1 of Jacobson’s PNAS paper. Furthermore, the latter reference states clearly on page 2095 that ‘The table is derived from a spreadsheet analysis of annually averaged end-use load data’ (my italics). Therefore, the answer to Question 11.1 is ‘average’, as stated by Jacobson.”

Contrast that methodology with how Dr. Clack and NAS arrive at their claim that the issues is a “*scientific disagreement*.” They don’t anywhere define what a fact is, what a scientific disagreement is, or the difference between a fact and a scientific disagreement. They also don’t anywhere acknowledge that the definition of values in Table 1 (whether maximum or average values) can be determined from the Jacobson Paper and its main reference, making the definition a question of fact, as proven by all four experts. Instead, they blindly claim that the definition of values is a “*scientific disagreement*” **without defining the term or providing a shred of proof.**

In doing so, they recklessly or intentionally misrepresent to the Court, for example, that “*At most, the Clack authors’ statement involved an interpretation of a table*” and

“The Academy therefore provided its readers with both plaintiff’s and the Clack authors’ positions on how the data should be interpreted, which is how scientific disagreements are supposed to be addressed and resolved.” (Nov. 27, 2017 NAS Memorandum at 13).

These statements are reckless or intentional misrepresentations because, as a scientist and as a scientific body, Dr. Clack and NAS, respectively, should know the difference between “*interpreting data*” and altering the definition of and omitting data (what the Clack Authors did) and between a “*scientific disagreement*” and altering the definition of and omitting data.

By dictionary definition, “*interpreting data*” has nothing to do with changing the definition of data and omitting data, which is what the Clack Authors did. Instead, it is the

“process of reviewing data through some predefined processes which will help assign some meaning to the data and arrive at a relevant conclusion”
(<https://www.formpl.us/blog/data-interpretation>).

For example, if 90% of cold days are cloudy, one interpretation of the data is that cloudy days lead to cold days. All four experts unanimously declare that the Clack Authors did NOT interpret data but instead changed the definition of data in the case of Table 1 and omitted data in the case of Canadian hydro. Specifically, when asked whether changing the definition of data in Table 1 from average to maximum values is an interpretation of data, the four experts stated

Exhibit 5: “*The Clack Paper was not making informed ‘interpretation of judgement of data,’ but rather was making changes to the factual definition of the data and omitting information, and then interpreting/judging based on these altered and omitted data;*”

Exhibit 6: “*This is not an interpretation/judgment of data but instead is altering the factual definition of data;*”

Exhibit 7: “*This is clearly an instance of altering the factual definition of data;*”

Exhibit 8: “*This is an instance of altering the factual definition of data. With erroneous conclusions then arising.*”

A scientific disagreement or argument involves “*people disagreeing about scientific explanations (claims) using empirical data (evidence) to justify their side of the argument*”
(<http://www.ces.fau.edu/nasa/introduction/scientific-inquiry/why-do-scientists-argue-and-challenge-each-others-results.php>). It is a disagreement about the interpretation of data and arises

“when we have incomplete information about the system of interest and different scientific hypotheses can be held that are consistent with the available data, logic and existing scientific facts” (Exhibit 2).

Changing the definition of data when the definition is determinable (making up data) and omitting data so that the research is not accurately reflected, have nothing to do with a scientific disagreement. When authors do these acts recklessly and negligently (in departure from accepted practice), as found here by all experts, as opposed to making “*honest errors*,” authors commit **data**

fabrication and falsification, respectively (65 Federal Register 76262). U.S. science bodies (e.g., National Science Foundation, National Institutes of Health) have adopted these definitions.

Further, research misconduct may arise EITHER “*intentionally, or knowingly, or recklessly. Only one of these needs to be demonstrated in order to satisfy this element of a research misconduct finding.*” (65 FR 76261). The Clack Authors’ altering the definition of data and omitting data, if accidental, would be excusable if the Clack Authors had corrected it after either consulting with the Jacobson Authors about their uncertainty or after the Jacobson Authors informed them of the error, with evidence, before or after publication. But the Clack Authors didn’t. Instead, the four experts declare that, because the Clack Authors hid their uncertainties until paper acceptance, then REFUSED to correct their factual errors when informed both before and after publication, the Clack Authors acted “*dishonest(ly)*,” “*in bad faith*,” “*with reckless disregard for the truth*,” “*unethical(ly)*,” “*contrary to standard practice in the field*,” and/or while “*failing to follow due diligence*” (Exhibits 5-8). As such, the Clack Author errors were NOT ‘*honest mistakes*’ or “*innocent errors*,” but were “*dishonest*” errors and made “*reckless(ly)*” and “*contrary to standard practice*.” (Exhibits 5-8). Based on NAS’ definition of “*scientific disagreement*,” any dispute about a fact, such as whether $1+1=2$, would be a “*scientific disagreement*.” However, the Clack Authors failure to diligently determine a fact correctly (as the experts conclude), does not make their claim that Table 1 contains maximum values a “*scientific disagreement*.”

All four experts also declare unanimously (Exhibits 1-8) that the Clack Authors and NAS published **false statements of fact** and NOT scientific disagreements with respect to all three “*egregious errors*,” not just the first:

Exhibit 1, Howarth: “*The issues I address in points #10 and #11 above are questions of fact, and are examples where the Clack Paper failed to follow due diligence. In my professional judgement, these facts can be correctly determined from evidence in the Jacobson et al. paper and in the sources cited there. Beyond that, if Dr. Clack and his*

colleagues were confused, normal scientific practice would have been for them to directly contact Dr. Jacobson for clarification, rather than to publish the critique as they did in the Clack Paper 15. In my professional opinion, the publication of the Clack Paper falls outside of the bounds of normal scientific debate.” (emphasis added)

Exhibit 2, Diesendorf: “12. My assessment is that Question 11.1 **is a question of fact** that I have verified from studying both the Jacobson PNAS paper itself and its reference 22 (also by Jacobson), which is the source of the data in Table 1 of Jacobson’s PNAS paper. Furthermore, the latter reference states clearly on page 2095 that ‘The table is derived from a spreadsheet analysis of annually averaged end-use load data’ (my italics). Therefore, the answer to Question 11.1 is ‘average’, as stated by Jacobson. 13. My assessment is that Question 11.2 **is a question of fact** that I have verified from both the Jacobson PNAS paper itself together with its reference 22, which states clearly on page 2102 that ‘In addition, 23 U.S. states receive an estimated 5.103 GW of delivered hydroelectric power from Canada’ (my italics). Therefore, the answer to Question 11.2 is ‘yes’, as stated by Jacobson.” (emphasis added)

Exhibit 3, Ingraffea: “8. Clearly, Clack et al. incorrectly assessed the numbers in Table 1 as “maximum” values... **This is not a matter of scientific disagreement. Rather, it is a matter of fact:** the numbers in Table 1 are either maximum values, or they are average values. 9. Claim #2: Clack alleges that it is only “scientific disagreement” concerning the Jacobson paper use of Canadian hydropower in its calculations. Again, this is a matter of fact, not opinion: either it does or it does not include such imports. The Clack paper clearly errs in fact in asserting that hydroelectric output used in the Jacobson paper calculations is from U.S. facilities only: ... ” (emphasis added)

Exhibit 4, Strachan: “11....it is clear that the answer to the **question** contained in 10.1 is average, as correctly stated by Dr. Jacobson...**This is a point of fact.** 12. Therefore, I am again perplexed as to why Dr. Clack and his co-authors made yet another basic error...**This is another point of fact.**” (emphasis added)

Exhibit 5, Howarth: “The Clack Paper then stated that Jacobson et al. had made a “modeling error,” when in fact the Clack Paper was simply mis-stating what Jacobson et al. had presented. The Clack Paper was not making informed “interpretation of judgement of data,” but rather was making changes to the factual definition of the data and omitting information, and then interpreting/judging based on these altered and omitted data.”

Exhibit 6, Diesendorf: “This is not an interpretation/judgment of data but instead is altering the factual definition of data.”

Exhibit 7, Ingraffea: “This is an instance where authors of the Clack paper made an incorrect inference about the model based on their own altering and obscuring of factual data...The unsupported inference of “modeling error” should have been obvious to the authors had they thoroughly checked for mathematical computer modeling error.”

Exhibit 8, Strachan: *“The Clack paper makes spurious claims in this respect. There is no evidence of “modelling errors.”*

In sum, based on the experts, the Court made a clear factual error when it found that *“the three asserted “egregious errors” are statements reflecting scientific disagreements, which were appropriately explored and challenged in scientific publications;...”* (April 20, 2020 Order at 24-25). The order is erroneous firstly because it uses the term *scientific disagreement* incorrectly. A *“scientific disagreement”* is a disagreement about how to interpret data to draw a scientific conclusion (Exhibit 2 and dictionary definition). A scientific disagreement does not arise when authors change the definition of or omit data then refuse to correct their errors. These acts are data fabrication and falsification, respectively. The Clack Authors and NAS published a false factual definition of data (Error 1) and omitted data (Error 2) then made *“an incorrect inference about the model based on their own altering and obscuring of factual data”* (Exhibit 7) (Error 3).

The four experts declare (Exhibits 5-8) that, in the process, the Clack Authors acted *“dishonest(ly),” “in bad faith,” “with reckless disregard for the truth,” “unethical(ly),” “contrary to standard practice in the field,”* and/or while *“failing to follow due diligence,”* thus acted with more than mere negligence, **three separate times:**

- a) The Clack Authors failed to request clarification of uncertainties before publishing their paper thus they were *“reckless,” “acting in disregard for the truth and in bad faith,” “not following due diligence expected from reviewers of scientific papers,”* and *“acting with disregard of the truth,”* respectively (Exhibits 5-8).
- b) The Clack Authors and NAS refused to correct factual mistakes when informed, with evidence, before publication. In this case, the Clack Authors *“should have either withdrawn their manuscript or completely revise it so as not to perpetuate their error,” “act(ed) in reckless*

disregard for the truth and in bad faith,” were in “*reckless disregard for the truth,”* and were “*fundamentally dishonest,”* respectively (Exhibits 5-8).

- c) Dr. Clack and NAS refused to correct their factual mistakes when informed with evidence after publication. This action was “*unethical,” “acting in reckless disregard for the truth and in bad faith,” “reckless disregard for the truth,”* and “*dishonest,”* respectively (Exhibits 5-8).

ANALYSIS

District of Columbia defamation law requires four elements:

“(1) that the defendant made a false and defamatory statement concerning the plaintiff; (2) that the defendant published the statement without privilege to a third party; (3) that the defendant’s fault in publishing the statement amounted to at least negligence; and (4) either that the statement was actionable as a matter of law irrespective of special harm or that its publication caused the plaintiff special harm.” (Oparaguo v. Watts, 884, A.2d 63, 76 (D.C. 2005).

If a public figure, Plaintiff must also prove Defendant acted with actual malice, which is “*with knowledge that [the statement] was false OR with reckless disregard of whether it was false or not.” Thompson v. Armstrong, 134 A.3d 305, 311 (D.C. 2016).*

In *Competitive Enterprises Institute vs. Mann* (150 A.3d 1213, D.C. 2016), the Appellate Court defined *reckless disregard* as refusing to act when provided with the truth (as in the present case) or when given “*obvious reasons to doubt the veracity*” of information that he or she will publish (as in the present case). In addition, a person merely stating “*he believed the statements were true when published*” does not override reckless disregard for the truth:

“[R]eckless conduct...The plaintiff may show that the defendant had such serious doubts about the truth of the statement inferentially, by proof that the defendant had a “high degree of awareness of [the statement’s] probable falsity.” Harte – Hanks Commc’ns , Inc. , 491 U.S. at 688, 109 S.Ct. 2678 (quoting Garrison v. Louisiana , 379 U.S. 64, 74, 85 S.Ct. 209, 13 L.Ed.2d 125 (1964)). A showing of reckless disregard is not automatically defeated by the defendant’s testimony that he believed the statements were true when published; the fact-finder must consider assertions of good faith in view of all the circumstances. St. Amant , 390 U.S. at 732, 88 S.Ct. 1323 (“[R]ecklessness may be

found where there are obvious reasons to doubt the veracity of the informant or the accuracy of his reports.").

Further, a defamatory statement is one that

"tends to injure [the] plaintiff in his trade, profession or community standing, or lower him in the estimation of the community." (Guilford Transp. Indus., Inc. v. Wilner, 760 A.2d 580, 594, DC 2000; CEI v Mann 150 A.3d 1213, DC 2016).

Also, a defamatory statement that injures a person can be explicit or implied:

"With respect to the remaining two statements, although they do not explicitly call Plaintiffs professionalism into question, a reasonable person could read these statements to imply that Plaintiffs conduct was unprofessional" (Houlahan v. Freeman Wall Aiello 15 F. Supp. 3d 77 (2014), at 82).

Experts (Exhibits 1-8) find Dr. Clack and NAS published the following factually false statements

"dishonest(ly)," "in bad faith," "with reckless disregard for the truth," "unethical(ly)," "contrary to standard practice in the field," and/or while "failing to follow due diligence."

"In fact, the flexible load used by LOADMATCH is more than double the maximum possible value from table 1 of ref. 11..."

"...generation proposed in ref. 11 is 402.2 TWh, 13% higher than the 25-y historical maximum of 356.5 TWh (1997)..."

"We note several modeling errors presented in ref. 11 that invalidate the results in the studies..."

"...contained modeling errors..."

"...have been modeled in erroneous ways and that these errors alone invalidate the study and its results..."

The statements imply that Prof. Jacobson and his students and coauthor *"don't check their work,"*

"are sloppy researchers," "are stupid," and "are incompetent." Indeed, that is what worldwide

newspaper headlines stated or implied, making Prof. Jacobson, who is a scientist, teacher, and

advisor of young adults, appear *"odious, infamous, or ridiculous."* The Cambridge dictionary

defines *"ridiculous"* as *"stupid or unreasonable and deserving to be laughed at,"* *"infamous"* as

"famous for something considered bad," and *"odious"* as *"extremely unpleasant and causing or*

deserving hate." The headlines used terms such as *"errors," "tooth-fairy research," "lie,"*

“scam,” “fantasy,” “wishful thinking,” “flawed,” “smacked down,” and “debunked.” These words collectively and individually, as well as the contents of the multiple articles, unequivocally made Prof. Jacobson and his research appear stupid, unreasonable, and deserving to be laughed at (*ridiculous*). They also made Prof. Jacobson famous for something bad, namely sloppy research (*infamous*). The words such as “lie” and “scam” also subjected him to hate online (*odious*). Words that make a person appear “*odious, infamous, or ridiculous*” give rise to a valid defamation claim *Johnson v. Johnson Publishing Co.*, 271 A.2d 696 (D.C.App. 1970).

In sum, Defamation can arise in several ways other than if words “*attack an individual’s honesty and integrity or imply as fact that an individual is engaged in professional misconduct*” (April 20, 2020 Court Order at 24). It can arise if the words, either implicitly or explicitly, damage the person’s reputation in his or her trade or profession or community or make a person appear odious, infamous, or ridiculous. Given that the Court must construe a “*complaint in the light most favorable to the plaintiff*,” *Oparaguo v. Watts*, 884, A.2d 63, 76 (D.C. 2005) when considering a dismissal of Plaintiff’s claim, there are no grounds for dismissing Plaintiff’s claim just because the words Plaintiff is contesting don’t directly attack his honesty or integrity. Even NAS admits that defamation arises for reasons beyond what the Court allowed. They state,

“The elements of a defamation claim are similar in California: libel is “a false and unprivileged publication by writing . . . which exposes any person to hatred, contempt, ridicule, or obloquy, . . . or which has a tendency to injure him in his occupation” (emphasis added) (Nov. 27, 2017 Mem. in Support of Special Motion to Dismiss, at 9)

With respect to Element 1 of DC Defamation Law, all four experts (Exhibits 1-8) unambiguously state that the statements by Dr. Clack and NAS were statements of fact and were false. Two experts, without being asked, also state that the statements harmed Prof. Jacobson’s reputation: Exhibit 1: “*I believe this caused harm to the reputation of Dr. Jacobson*” and Exhibit 4:

“It is my perception that Dr. Jacobson has suffered significant loss of professional reputation and public standing following the publication of this paper and the media coverage that has followed. I have, for example, witnessed Dr. Jacobson’s work being unfairly mocked in social media outlets such as Twitter, with the Dr. Clack et al. (2017) paper then cited as evidence that Dr. Jacobson’s work is in some way flawed (which in my expert opinion it is not).”

Indeed, yet another scientist, Prof. Christian Breyer from Finland, has stated, *“The Clack et al. article had been the most hostile & aggressive article I have seen in my entire career.”*

<https://twitter.com/ChristianOnRE/status/1428048271533035523>. The damage went beyond the headlines. It caused Prof. Jacobson embarrassment and financial loss. It scarred the reputation of Dr. Mary Cameron, a student author of the Jacobson Paper, so much, she withdrew from academia:

“As an early career scientist, I should have been able to leverage the prestige and accomplishment of the Cozzarelli Prize to obtain a tenured academic position, which was my long-term goal. Instead, my reputation is scarred and I have had to withdraw from academia altogether.” (Exhibit 9)

With respect to Element 2 of Defamation law, all parties agree that the statements were published *“without privilege to a third party.”* With respect to Element 3, all experts (Exhibits 5-8) declare that Dr. Clack and NAS acted more than negligently and not honestly, but with *“reckless disregard for the truth,” “dishonest(ly),” “in bad faith,” “unethical(ly),” “contrary to standard practice in the field,”* and/or *“failing to follow due diligence,”* thus maliciously.

Finally, the Court erred by giving the benefit of the doubt to the Defendants (*Oparaguo v. Watts*, 884, A.2d 63, 76 (D.C. 2005)). Neither Dr. Clack nor NAS showed *“beyond doubt that [plaintiff] can prove no set of facts in support of his claim...”* To the contrary, facts in this case and Exhibits 1-8 prove beyond a doubt that Dr. Clack and NAS published false facts with reckless disregard for the truth, causing harm to Prof. Jacobson, two students, and a colleague.

CONCLUSION

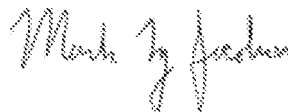
The first and foremost basis for the legal fee rulings against Prof. Jacobson was the belief that the false facts in questions were *“scientific disagreements.”* This claim is a clear error of fact caused

by the mis-definition and mis-use of the term “*scientific disagreement*,” as indicated by four independent experts (Exhibits 1-8), who also found that the false facts were made with reckless disregard for the truth (Exhibits 4-8), thus maliciously. The false facts made Plaintiff appear “*odious, infamous, or ridiculous*” AND damaged him in his occupation, thereby causing defamation. As such, multiple sets of facts exist indicating Prof. Jacobson’s defamation case would likely have succeeded on its merits. The Court is therefore requested to VACATE its Order to pay Dr. Clack legal fees, thereby bringing this case to a just and accurate conclusion.

Respectfully submitted,

Date: September 24, 2021

Mark Z. Jacobson



Pro Se

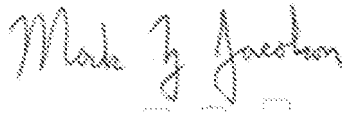
Mark Z. Jacobson
946 Valdez Place
Stanford, CA 94305
(650) 468-1599
jacobson@stanford.edu

POINTS AND AUTHORITIES

1. Rule 41(a)(1)(A)(i) of the Superior Court Rules of Civil Procedure.
2. Rule 59(e) of the Superior Court Rules of Civil Procedure.
3. Rules 60(b)(3); 60(b)(2); 60(b)(1) of the Superior Court Rules of Civil Procedure.
4. D.C. Code 16-5502
5. Federal Rule of Evidence 702
6. 65 Federal Register 76261-76262
7. The cases cited herein.
8. The inherent authority of the Court.

RULE 12-I CERTIFICATION

Undersigned hereby certifies that on September 18, 2021, he wrote to counsel for Defendant Dr. Clack informing counsel of Plaintiff's intent to file the present motion, including the Expert testimony. Defendant did not consent to the instant Motion.



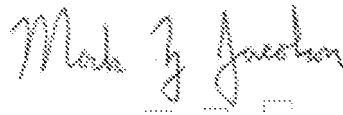
Mark Z. Jacobson

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a copy of foregoing was served via Case File Xpress this 24th
day of September 2021 on:

Evangeline C. Paschal Esposito, Esq.
Hunton Andrews Kurth LLP
2200 Pennsylvania Avenue, N.W.
Washington, D.C. 20037
Counsel for Defendant
National Academy of Sciences

Drew W. Marrocco, Esq.
Clinton A. Vince, Esq.
Dentons US LLP
1900 K Street, N.W.
Washington, D.C. 20006
Counsel for Defendant
Christopher T.M. Clack, Ph.D.



Mark Z. Jacobson

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EXHIBIT 1

Declaration of Dr. Robert Howarth

1. My name is Robert W. Howarth, Ph.D. I am over the age of 18 and competent to make the following Declaration.
2. I have been a tenured faculty member at Cornell University, Ithaca, NY, since 1985. Since 1993, I have held an endowed position at Cornell as the *David R. Atkinson Professor of Ecology & Environmental Biology*.
3. I have extensive experience in academic publishing. I am the author or co-author of over 200 papers, and these have been cited by others in the peer-reviewed literature more than 65,000 times. I am the Founding Editor of the academic journal *Biogeochemistry* and served as Editor-in-Chief of that journal from 1983 to 2004. I was also the Editor-in-Chief of the academic journal *Limnology & Oceanography* from 2014 to 2019.
4. I served on the Committee on Ethics of the America Society for Limnology & Oceanography from 1992-1998. I served as President-Elect and then President of the Coastal & Estuarine Research Federation from 2005 to 2009, overseeing the publications and ethical issues of that professional society. And I have been a member of the Committee on Publication Ethics (COPE) since 2014. COPE “is a nonprofit organization whose mission is to define best practice in the ethics of scholarly publishing and to assist editors, publishers, etc. to achieve this.” (https://en.wikipedia.org/wiki/Committee_on_Publication_Ethics)
5. I am aware of the litigation filed by Dr. Mark Jacobson against Dr. Clack and others associated with writing and publishing the paper entitled “Evaluation of a proposal for reliable low-cost grid power with 100% wind, water and solar,” *PNAS*, doi:1073/pnas.1610381114, 2017 (the “Clack Paper”).
6. I am not a party to the litigation and have not participated in the litigation prior to filing this Declaration.
7. I was not associated with the publication of the Clack Paper nor of the 2015 paper by Dr. Jacobson and others, also published in *PNAS*, that was the subject of the Clack Paper.
8. I have previously collaborated with Dr. Jacobson and am a co-author of two papers with him published in 2013 and 2014 (Jacobson, M.Z., R.W. Howarth, M.A. Delucchi, S.R. Scobies, J.M. Barth, M.J. Dvorak, M. Klevze, H. Katkhuda, B. Miranda, N.A. Chowdhury, R. Jones, L. Plano, and A.R. Ingraffea, 2013, “Examining the feasibility of converting New York State’s all-purpose energy infrastructure to one using wind, water, and sunlight,” *Energy Policy* 57: 585-601, doi.org/10.1016/j.enpol.2013.02.036i; and Jacobson, M.Z., M.A. Delucchi, A.R.

Ingraffea, R.W. Howarth, G. Bazouin, B. Bridgeland, K. Burkart, M. Change, N. Chowdhury, R. Cook, G. Escher, M. Galka, L. Han, C. Heavey, A. Hernandez, D.F. Jacobson, D.S. Jacobson, B. Miranda, G. Novotny, M. Pellat, P. Quach, A. Romano, D. Steward, L. Vogel, S. Wang, H. Wang, L. Willman, and T. Yeskoo, 2014, "A roadmap for repowering California for all purposes with wind, water, and sunlight," *Energy*, doi.org/10.1016/j.energy.2014.06.099).

9. I have carefully reviewed both the Jacobson et al. 2015 paper and the Clack Paper.
10. The Clack Paper claimed that Table 1 in the Jacobson paper presented maximum values, and they therefore concluded that the Jacobson et al. a discrepancy between the table and figures presented in the paper. The Clack Paper is wrong with regard to this claim. Table 1 presented average values. Consequently, the Clack Paper is also wrong to have concluded there was any discrepancy. There was not. It is not at all apparent how the Clack Paper reached this erroneous conclusion, which lies at the heart of their criticism of the paper by Jacobson and colleagues.
11. The Jacobson et al. 2015 paper includes hydro power from Canada. The Clack Paper failed to recognize this, and therefore mistakenly claimed that the annual average hydro-power values used by Jacobson et al. were too high: the Clack Paper was wrong in their assumption that the hydro values in Jacobson et al. were just for power produced within the United States.
12. The issues I address in points #10 and #11 above are questions of fact, and are examples where the Clack Paper failed to follow due diligence. In my professional judgement, these facts can be correctly determined from evidence in the Jacobson et al. paper and in the sources cited there. Beyond that, if Dr. Clack and his colleagues were confused, normal scientific practice would have been for them to directly contact Dr. Jacobson for clarification, rather than to publish the critique as they did in the Clack Paper.
13. As an expert on scientific publishing, I conclude that the Clack Paper should not have been published in the *Proceedings of the National Academy of Sciences* as a "Research Article." The Clack Paper is clearly not a research article, either as generally defined by the community of research scientists or as specified by the journal's own guidelines. These guidelines state that the journal only publishes research articles if they are based on "original scientific research of exceptional importance..." (<https://www.pnas.org/page/authors/purpose-scope>). There was no original research in the Clack Paper.
14. The Clack Paper was written specifically and exclusively as a comment on the Jacobson et al. paper. There were no new data presented. There were no hypotheses tested. This was not original research. As such, if it were to have been published at all, it should have been

published as a “Letter” or as a “Commentary.” This is true under either general science-publishing traditions or the specific rules and guidelines of the *Proceedings of the National Academy of Sciences* (<https://www.pnas.org/page/authors/purpose-scope>). Note that these journal guidelines specify that Letters be used to “point out potential flaws in studies published in the journal.” That is not the purpose of a Research Article.

15. In my professional opinion, the publication of the Clack Paper falls outside of the bounds of normal scientific debate. PNAS did not follow normal publication procedures, defined either in terms of general norms in our field or the specific guidelines of their own journal. I believe this caused harm to the reputation of Dr. Jacobson.

I declare under penalty of perjury that the foregoing is true and correct, to the best of my knowledge. Executed on July 20, 2020 from my home in Trumansburg, NY.



Robert W. Howarth, Ph.D.

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EXHIBIT 2

**SUPERIOR COURT OF THE DISTRICT OF COLUMBIA
CIVIL DIVISION**

Mark Z. Jacobson, Ph.D.,

Plaintiff,

v.

Christopher T.M. Clack, Ph.D.

and

National Academy of Sciences,

Defendants.

2017 CA 006685 B

Judge Elizabeth Wingo

Next Court Date: None Scheduled

DECLARATION OF DR MARK O. DIESENDORF

Declaration of Dr Mark O. Diesendorf

1. My name is Mark O. DIESENDORF, I am over the age of 18 years and am competent to make the following declaration.
2. I am currently Honorary Associate Professor at UNSW Sydney, formerly called the University of New South Wales. Previously, at various times before my nominal retirement in 2016, I was a Principal Research Scientist in Australia's national research organization, CSIRO; Professor of Environmental Science and Founding Director of the Institute for Sustainable Futures at University of Technology Sydney; Associate Professor and Deputy Director of the Institute of Environmental Studies at UNSW Sydney; and Education Program Leader of the Australian Cooperative Research Centre for Low Carbon Living. As an author or coauthor, I have published 78 peer-reviewed journal papers, three scholarly books, 36 scholarly book chapters and 13 peer-reviewed conference papers.
3. From 2011 to 2016 I was a senior researcher in a research program at UNSW Sydney that performed computer simulation modelling of the operation of the Australian National Electricity Market running entirely on renewable energy. I am co-author of several peer-reviewed journal papers on this particular topic. This research is similar to that conducted on the electricity systems of the United States of America by Dr Mark Jacobson. Therefore, I have expertise in the scientific issues discussed in Dr Jacobson's and Dr Clack's journal papers published in PNAS in 2015 and 2017 respectively. I have studied both papers.
4. I understand that Dr Jacobson has initiated litigation against Dr Clack on the grounds that the Clack paper and public statements by Dr Clack misrepresent Dr Jacobson's paper.
5. I have not been involved in this litigation prior to making this declaration am not a co-author of either of the papers relevant to this litigation.
6. Dr Jacobson has requested my expert opinion on whether three issues raised in the case are matters of fact or of scientific disagreement.

7. As a scientist, I understand that a fact is something that has either been proven to be true or is true by definition or logical argument. The following are examples of facts:
 - 7.1 That I am an Australian citizen, because it can be verified by inspection of my birth certificate and passport.
 - 7.2 That, if 2 and 3 are real numbers, $2 + 3 = 3 + 2 = 5$.
 - 7.3 That the Earth is warming, because it has been verified by scientific measurements taken over decades by many independent research groups based in different countries.
8. As a scientist, I understand that a scientific disagreement can occur when we have incomplete information about the system of interest and different scientific hypotheses can be held that are consistent with the available data, logic and existing scientific facts. For example, it is at present a matter of scientific disagreement as to whether there is any kind of life on Mars or whether human-induced climate change is already irreversible by human actions.
9. I wish to emphasize that disagreement between scientists is not always the same as 'scientific disagreement'. For example, a scientist who dislikes me could claim incorrectly that I am not an Australian citizen, although I can supply strong documentary evidence to show that I am an Australian citizen. This disagreement between scientists is not a scientific disagreement, because the scientist making the incorrect claim is not basing it on science but rather on emotion.
10. Another example of a disagreement between scientists that is not a scientific disagreement is the following. Based on their religious beliefs, a scientist could claim that the earth was created literally in seven days, but to do this they would have to ignore all the fossil, geological and biological evidence to the contrary; this disagreement is not a scientific disagreement.
11. Dr Jacobson asserts that the following three questions raised in the litigation are issues of fact and not issues of scientific disagreement:
 - 11.1 Does Table 1 of the Jacobson paper, published in PNAS in 2015, contain maximum or average values?

11.2 Did the Jacobson PNAS paper contain imported Canadian hydro power as part of its results?

11.3 Is there a modelling error in Jacobson's LOADMATCH computer code that he used in his PNAS paper?

12. My assessment is that Question 11.1 is a question of fact that I have verified from studying both the Jacobson PNAS paper itself and its reference 22 (also by Jacobson), which is the source of the data in Table 1 of Jacobson's PNAS paper. Furthermore, the latter reference states clearly on page 2095 that 'The table is derived from a spreadsheet analysis of annually *averaged* end-use load data' (my italics). Therefore, the answer to Question 11.1 is 'average', as stated by Jacobson.
13. My assessment is that Question 11.2 is a question of fact that I have verified from both the Jacobson PNAS paper itself together with its reference 22, which states clearly on page 2102 that 'In addition, 23 U.S. states receive an estimated 5.103 GW of delivered hydroelectric power *from Canada*' (my italics). Therefore, the answer to Question 11.2 is 'yes', as stated by Jacobson.
14. Whether Question 11.3 is a question of fact or of scientific disagreement depends on the definition of 'modeling error'. As a modeler myself, I believe that the vast majority of scientists would interpret 'modeling error' as an error or bug in the computer code, as I do. Such an apparent scientific disagreement can be resolved *factually* from expert examination of the computer code and the model output. To establish the existence of such a modelling error, Clack would have to present evidence identifying it. His paper fails to do this and therefore fails to establish that there is a genuine scientific disagreement.
15. Instead, Clack's paper identifies results he contests in Jacobson's paper and includes them in the section of Clack's paper called 'Modeling Errors'. In my assessment the Clack paper is claiming the contested results are due to computer bugs in the LOADMATCH computer model.
16. In particular, the following statement is in the Clack paper's section on Modeling Errors:

‘In fact, the flexible load used by LOADMATCH is more than double the maximum possible value from table 1 of ref. 11. The maximum possible from table 1 of ref. 11 is given as 1,064.16 GW, whereas figure 3 of ref. 11 shows that flexible load (in green) used up to 1,944 GW (on day 912.6). Indeed, in all of the figures in ref. 11 that show flexible load, the restrictions enumerated in table 1 of ref. 11 are not satisfied.’

In my reading, the quoted sentences claim that Jacobson’s paper has a software bug, because Jacobson’s figures don’t match their Table 1. But this claim is based on Clack’s factually incorrect reading of the values in Jacobson’s Table 1, as pointed out in Paragraph 12 of this Declaration. Clack has assumed incorrectly that Jacobson’s Table 1 contains maximum values when it actually contains average values. Therefore, this Claim by Clack, that Jacobson’s paper contains a modelling error, i.e. an error or bug in the computer code, has not been established.

17. Similarly, the following statement is in the Clack paper’s section on Modeling Errors:

‘For example, the numbers given in the supporting information of ref. 11 imply that maximum output from hydroelectric facilities cannot exceed 145.26 GW (SI Appendix, section S1.1), about 50% more than exists in the United States today (15), but figure 4B of ref. 11 (Fig. 1) shows hydroelectric output exceeding 1,300 GW.’

Once again, I read this as a claim that Jacobson’s paper contains an error or bug in the computer code, because the Clack paper states Jacobson’s figure 4B, which derives from the LOADMATCH computer program, has values that exceed 145.26 GW, thus a discrepancy exists between model output and other data from the paper. Again, whether such a difference is due to a computer bug can be determined factually, thus is a question of fact, not a question of scientific disagreement.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on 4 August 2020.

Mark Oliver Diesendorf

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EXHIBIT 3

**SUPERIOR COURT OF THE DISTRICT OF COLUMBIA
CIVIL DIVISION**

Mark Z. Jacobson, Ph.D.,	)	
	)	
Plaintiff,	)	
	)	
v.	)	2017 CA 006685 B
	)	Judge Elizabeth Wingo
Christopher T.M. Clack, Ph.D.	)	Next Court Date: None Scheduled
	)	
and	)	
	)	
National Academy of Sciences,	)	
	)	
Defendants.	)	
_____	)	

DECLARATION OF DR. ANTHONY R. INGRAFFEA

DECLARATION OF DR. ANTHONY R. INGRAFFEA

1. My name is Dr. Anthony R. Ingraffea. I am over the age of 18 and competent to make the following Declaration.
2. I currently am the Dwight C. Baum Professor of Engineering, Emeritus, at Cornell University.
3. I am author or co-author of over 250 peer-reviewed technical publications, including papers in the PNAS.
4. I have authored or co-authored papers related to the ongoing national energy transition, including papers co-authored by Dr. Jacobson.
5. I am aware of the litigation filed by Dr. Jacobson and certain claims related to papers entitled Jacobson MZ, Delucchi MA, Cameron MA, Frew BA (2015a) *Low-cost solution to the grid reliability problem with 100% penetration of intermittent wind, water, and solar for all purposes*, PNAS 112:15060–15065 and Jacobson MZ, Delucchi MA, Cameron MA, Frew BA (2015b) *Low-cost solution to the grid reliability problem with 100% penetration of intermittent wind, water, and solar for all purposes*, PNAS 112:15060–15065 (the “Jacobson papers”), and *Evaluation of a proposal for reliable low-cost grid power with 100% wind water and solar*, PNAS, doi:1073/pnas.1610381114, 2017 (the “Clack paper”). I am not a co-author of any of these papers, and am examining them as an independent scholar for the purposes of this declaration.
6. I was not named as a defendant in the litigation and have not participated in the litigation prior to submitting this Declaration.
7. The Clack paper claims that the Jacobson Papers “...do not show the technical, practical, or economic feasibility of a 100% wind, solar, and hydroelectric energy vision...” and contain “...modeling errors; incorrect, implausible, and/or inadequately supported assumptions; and the application of methods inappropriate to the task.” The purpose of my declaration is to refute three (3) of the most important claims of the Clack paper and their assertion that it is mere “scientific disagreement” that is the space between theirs and the Jacobson papers.
8. Claim #1: The Clack paper bases much of its allegations pertaining to unfeasibility, inaccuracy, and modeling errors on its incorrect assessment of Table 1 in the Jacobson paper (2015a). Clearly, Clack *et al.* incorrectly assessed the numbers in Table 1 as “maximum” values. They state:

“The maximum possible from table 1 of ref. 11 is given as 1,064.16 GW, whereas figure 3 of ref. 11 shows that flexible load (in green) used up to 1,944 GW (on day 912.6). Indeed, in all of the figures in ref. 11 that show flexible load, the restrictions enumerated in table 1 of ref. 11 are not satisfied.” (**emphasis mine**)

The Jacobson paper (2015a) clearly states, through a footnote citation to an earlier Jacobson paper (Jacobson *et al.* Energy and Environmental Sciences, 2015), that the numbers in Table 1 are not “maximum” values, but rather “average” annual values. This is not a matter of scientific disagreement. Rather, it is a matter of fact: the numbers in Table 1 are either maximum values, or they are average values. It is not a matter of scientific disagreement to state that, for example, two parties can look at the set of numbers, 5-6-7-8-9-10, and disagree on the point that their average is 7.5 while their maximum is 10. That would be a disagreement of fact, not opinion, scientific or otherwise. This is a crucial point, because subsequent incorrect allegations based on this error in fact percolate throughout the remainder of the Clack paper, as they themselves state:

“Indeed, in all of the figures in ref. 11 that show flexible load, the restrictions enumerated in table 1 of ref. 11 are not satisfied.”

9. Claim #2: Clack alleges that it is only “scientific disagreement” concerning the Jacobson paper use of Canadian hydropower in its calculations. Again, this is a matter of fact, not opinion: either it does or it does not include such imports. The Clack paper clearly errs in **fact** in asserting that hydroelectric output used in the Jacobson paper calculations is from U.S. facilities only:

“For example, the numbers given in the supporting information of ref. 11 imply that maximum output from hydroelectric facilities cannot exceed 145.26 GW (SI Appendix, section S1.1), about 50% more than exists in the United States today (15).”

However, in a footnote to Table S2 of the Jacobson paper (2015a), there is clear reference to the same earlier Jacobson paper which clearly defined hydropower capacity used in Jacobson’s calculations as the sum of both U. S. supplies and imported Canadian supplies.

10. Claim #3: The Clack paper includes a distinct section entitled “Modeling Errors” implicating Jacobson’s LOADMATCH computer program as a source of such alleged errors. However, the Clack paper also includes a distinct section entitled “Implausible Assumptions”. I have led the development of many predictive computer programs, including highly successful commercial programs, and am very aware of the distinction between an alleged modeling error and an implausible assumption in the execution of a computer program. A modeling error is commonly known as a “bug” in the code: given correct input, it gives incorrect, or no, output. A code is not “buggy” if it is given incorrect input but correctly performs all its intended operations on that input; in this case, the incorrect input was based on incorrect or implausible assumptions. Therefore, I conclude that the Clack paper was asserting in its “Modeling Error” section the existence of a “bug” or “bugs” in LOADMATCH; else, why include a separate section called “Implausible Assumptions”?

11. Together, claims #1, #2, and #3 indicate to me a degree of carelessness in the Clack paper that should have been caught and corrected, pre-publication, by one or more of the 21 co-authors of the paper and/or by one or more of its PNAS reviewers.

I declare under penalty of perjury that the foregoing is true and correct. Executed on July 22, 2020.

A handwritten signature in black ink, appearing to read 'A. Ingraffea', with a long horizontal flourish extending to the right.

Anthony R. Ingraffea

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EXHIBIT 4

Declaration of Professor Peter A. Strachan

1. My name is Peter Anderson Strachan. I am over 18 years of age and am competent to make the following declaration.
2. I have been an academic member of staff at the Robert Gordon University, Aberdeen, Scotland, since 1993. I am currently Professor of Energy Policy at the Aberdeen Business School. I was appointed Professor of Energy Policy in 2009 and subsequently appointed in 2010 to the role of Group Lead for Strategy and Policy, responsible for a research and teaching group of approximately 20 full-time and part-time academic staff. Following University re-organisation, I returned to my role as Professor of Energy Policy in 2017. My most recent publications are in prestigious peer reviewed journals such as Energy Policy (2019) and Utilities Policy (2020) on the theme of offshore wind power.
3. As an author and co-author, I have an extensive publication record with my work focusing on the transition to 100% renewable energy in Scotland and the other countries that comprise the United Kingdom. I have edited three books and have also served as a journal Associate Editor. Further, I am an active member of several editorial boards. My work by invitation has been presented to the First Minister of Scotland, Holyrood, Edinburgh, Scotland and to Members of Parliament (MPs) of the United Kingdom Parliament, Westminster, London, England. I also receive regular invitations to present at academic and industry events on renewable energy issues. A full list of articles and presentations is available on request. I have also supervised to successful completion 18 doctoral students, with a number of these on renewable energy deployment, particularly in Africa.
4. My research on renewable energy has been funded by Innovate UK and the United Kingdom Economic and Social Research Council (ESRC). The research I work on in Scotland and Europe is very similar to the work on renewable energy published by Dr Jacobson in the context of the United States. Therefore, I have specific expertise to comment on the papers published by PNAS by Dr Jacobson et al. and Dr Clack et al. in 2015 and 2017, respectively. I am familiar with both papers and have spent some time re-reading and then re-evaluating them in the context of making this declaration.
5. I am aware that Dr Jacobson has initiated litigation against Dr Clack on the basis that the Dr Clack PNAS paper and resulting media coverage misrepresented the findings of Dr Jacobson's article and that this has had a detrimental impact on his professional reputation and wider standing in the public domain.
6. I have not been involved in the litigation and am not a co-author, of either of the papers relevant to this litigation. I have not published with Dr Jacobson or any of the authors of the Dr Clack et al. (2017) paper and have no professional association (joint research funding or PhD supervision) with these authors. Therefore, I am offering the following declaration in an independent capacity.
7. Dr Jacobson has requested my expert opinion and has asked me to comment on three issues raised by this case and these are set out in my declaration in points 10-13 below. However, my declaration has been extended to provide comment on related matters points 8 and 9 below which I think are important, and that the Court may consider of wider relevance.
8. As an expert with considerable experience of publishing, I am astonished that the Dr Clack et al. (2017) paper was published by PNAS as a research article. The PNAS publication guidelines are publicly available, with the Dr Clack et al. (2017) paper apparently contravening these guidelines, as there is no original research in the Dr Clack et al. (2017) paper, which in my perception must call into question the commissioning as well as the referee process for their paper. I am dismayed that the journal commissioning editor never identified this important point prior to sending the paper to referees. Furthermore, the referee process must also be called into question,

given the apparent errors by Dr Clack and his co-authors (which I comment on below) in the published version of their paper. If the court considers relevant and if it has not already done so, it should in my opinion request all email and other relevant correspondence from the PNAS on the commissioning process, the resulting referee process, decisions made on publication, and come to a view on how rigorous this overall process was.

9. It is my perception that Dr Jacobson has suffered significant loss of professional reputation and public standing following the publication of this paper and the media coverage that has followed. I have for example witnessed Dr Jacobson's work being unfairly mocked in social media outlets such as Twitter, with the Dr Clack et al. (2017) paper then cited as evidence that Dr Jacobson's work is in some way flawed (which in my expert opinion it is not). It is also my view that Dr Ken Caldeira (@KenCaldeira) continues to inflame this situation with recent social media posts such as that on 10th July 2020. Dr Caldeira has more than 24,000 Twitter followers. In the energy space this is a large following. The tweet in question was retweeted 95 times and liked 234 times. This tweet received numerous comments some of which I consider potentially defamatory towards Dr Jacobson, though that would be for a Court to decide.
10. More specifically Dr Jacobson has asked me to comment on three issues:
 - 10.1) Does Table 1 in the Dr Jacobson et al. paper (2015) contain maximum or average values?
 - 10.2) Did the Dr Jacobson et al. (2015) paper contain imported Canadian Hydro power as part of its results?
 - 10.3) Is there a modelling error in Dr Jacobson's Loadmatch computer code that he used in his (2015) paper?
11. From reading the Dr Jacobson et al. (2015) paper and diligently following up on sources contained within the paper – as a professionally qualified researcher would always do – it is clear that the answer to the question contained in 10.1 above is *average*, as correctly stated by Dr Jacobson. I am confused as to why Dr Clack and his co-authors made such a basic error. Furthermore, and as part of the referee process for the Dr Clack et al. (2017) paper, I am astonished that the Dr Clack et al. (2017) error was not identified by suitably qualified referees. There should be no scientific disagreement as to the question of *average*. This is a point of fact.
12. In answering the question in 10.2, the Dr Jacobson et al. (2015) paper contained *Canadian Hydro Power*, as correctly stated by Dr Jacobson. Therefore, I am again perplexed as to why Dr Clack and his co-authors made yet another basic error. Furthermore, and as part of the referee process for the Dr Clack et al. (2017) paper, I would have expected a robust editor and referee process to have identified their obvious errors. There should be no scientific disagreement as to the question of *Canadian Hydro Power*. This is another point of fact.
13. In answering the question in 10.3, I would need to defer to a modelling expert as this is beyond my specific area of expertise, but it would appear to me as a professionally qualified researcher with a PhD in mixed research methods, that Dr Clack et al. (2017) based their assumptions on an incorrect reading of the Jacobson et al. (2015) paper as noted above. There is no substantive evidence available that Dr Jacobson et al.'s (2015) paper contains any modelling errors, which I interpret to mean "computer bugs" and not poor assumptions given that there are separate sections for "Modelling Errors" and "Implausible Assumptions" in the Dr Clack et al. (2017) paper. The Dr Clack et al. (2017) analysis appears to be entirely speculative rather than based on scientific evidence and facts.
14. It is my view that Dr Clack et al. (2017) reached erroneous conclusions, which may have been confounded by both the commissioning of this piece, a lack of editor and

referee scrutiny during the review process, and further exacerbated by the fact that the inclusion of the Dr Clack et al. (2017) paper appears to contravene the Journal's own publication guidelines. As a matter of fact, the Dr Clack et al. (2017) paper is not a "Research Article" as generally defined by the scientific community and more specifically the journals own guidelines. In my view the Dr Clack et al. (2017) paper is no more than an extremely well written (in style, only) but very poorly researched opinion piece that lacks a robust reading of the Jacobson et al. (2015) paper, but yet it has been presented by PNAS as a "Research Article".

15. To conclude, I have also witnessed that Dr Jacobson has suffered significant loss of professional reputation and public standing following the publication of the Dr Clack et al. (2017) paper, and the media coverage that subsequently followed. At least one of co-authors of the Dr Clack et al. (2017) paper, as outlined above, continues to inflame this situation given continued social media posts which result in potentially defamatory comments being made against Dr Jacobson.

I declare under penalty of perjury that the following is true and correct. Executed on 10th August 2020.

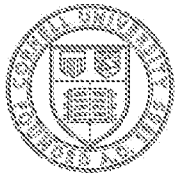
A handwritten signature in black ink, reading "Peter A. Strachan". The signature is written in a cursive, slightly slanted style.

Signed: Professor Peter A. Strachan of 2 Henderson Park, Peterhead, Aberdeenshire, Scotland

Dated: 10th August 2020

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EXHIBIT 5



Declaration of Robert W. Howarth

I write at the request of Prof. Mark Jacobson of Stanford to provide my expert opinion regarding the paper by Clack and others entitled “Evaluation of a proposal for reliable low-cost grid power with 100% wind, water and solar” that was published in 2017 in *PNAS*, doi:1073/pnas.1610381114. (the “Clack Paper”). Also at Prof. Jacobson’s request, I submitted a declaration one year ago on July 20, 2021 on the Clack Paper for the court.

I have been a tenured faculty member at Cornell University, Ithaca, NY, since 1985. Since 1993, I have held an endowed position at Cornell as the *David R. Atkinson Professor of Ecology & Environmental Biology*. I have extensive experience in academic publishing. I am the author or co-author of over 200 papers, and these have been cited by others in the peer-reviewed literature more than 70,000 times. I am the Founding Editor of the academic journal *Biogeochemistry* and served as Editor-in-Chief of that journal from 1983 to 2004. I was also the Editor-in-Chief of the academic journal *Limnology & Oceanography* from 2014 to 2019. And I have recently been appointed Co-Editor-in-Chief of *Ocean-Land-Atmosphere Research*. I served on the Committee on Ethics of the American Society for Limnology & Oceanography from 1992-1998. I served as President-Elect and then President of the Coastal & Estuarine Research Federation from 2005 to 2009, overseeing the publications and ethical issues of that professional society. And I have been a member of the Committee on Publication Ethics (COPE) since 2014. COPE “is a nonprofit organization whose mission is to define best practice in the ethics of scholarly publishing and to assist editors, publishers, etc. to achieve this.” (https://en.wikipedia.org/wiki/Committee_on_Publication_Ethics).

I have previously collaborated with Prof. Jacobson and am a co-author of three published peer-reviewed papers with him (Jacobson et al. 2013, *Energy Policy*; Jacobson et al. 2014, *Energy*; Howarth and Jacobson 2021, *Energy Science & Engineering*).

I am aware of the litigation filed by Prof. Jacobson against Dr. Clack and others associated with the Clack Paper, but I am not a party to the litigation and I had no participation with it other than filing the declaration for the court a year ago. Nor was I associated with the publication of the Clack Paper or the 2015 paper by Prof. Jacobson and others, also published in *PNAS*, that was the subject of the Clack Paper. I have, however, carefully reviewed both of these two papers.

Prof. Jacobson has asked that I address a series of questions regarding the Clack Paper.

1. “Is omitting data or changing the definition of data to the wrong definition an ‘interpretation or judgment of data’ or is it ‘not an interpretation/judgment of data but instead altering the factual definition of data’?”

In my professional opinion, the Clack Paper incorrectly took average values in a table from the Jacobson et al. paper and stated that these were maximum values. Further, the Clack Paper omitted that

the hydropower production estimate in the Jacobson et al. paper included imported Canadian hydropower, and then based on this omission erroneously stated that the estimate of the Jacobson et al. paper was excessively high for hydropower. The Clack Paper then stated that Jacobson et al. had made a “modeling error,” when in fact the Clack Paper was simply mis-stating what Jacobson et al. had presented. The Clack Paper was not making informed “interpretation of judgement of data,” but rather was making changes to the factual definition of the data and omitting information, and then interpreting/judging based on these altered and omitted data.

2. “Is an author who makes a factual mistake in a review of other people's work following due diligence or acting in reckless disregard for the truth or in bad faith?”

Again in my professional experience, and based on decades of involvement with the ethics of scientific publication, I believe that the Clack Paper was reckless. Due diligence would have demanded that Dr. Clack and his coauthors contact Prof. Jacobson for clarification before they submitted their manuscript to *PNAS*. Due diligence would also have required that Dr. Clack and coauthors correct their factual misinterpretation of the Jacobson et al. paper, and do so quickly once they became aware of their error. If they were aware before the paper was published, Dr. Clack and coauthors should have either withdrawn their manuscript or completely revise it so as not to perpetuate their error. If they only became aware of the error after publication in *PNAS*, they should have asked the journal to publish a correction, and perhaps an apology. Further, Prof. Jacobson informs me that one of the authors of the Clack Paper had earlier mentored a student who was a coauthor of the Jacobson et al. paper criticized by the Clack Paper, and that Dr. Clack and his coauthors did not inform this student of their criticism until after acceptance for publication of the Clack Paper. If true, this is highly unprofessional behavior, in my opinion.

3. “Is it standard practice in the sciences for authors of a paper to issue a correction to the paper AFTER publication if a material FACTUAL error is discovered in their paper?”

Yes, professional ethics require authors to publish a correction within a reasonable time after they discover an error with their work.

4. “Is it unethical or ethical for authors of a paper to REFUSE to issue a correction to their paper AFTER publication if a material FACTUAL error is discovered in their paper?”

Again, professional ethics require authors to publish a correction. Refusal to do so is unethical.

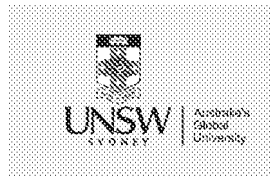
I declare under penalty of perjury that the foregoing is true and correct. Executed on 14 September 2021.



Robert W. Howarth, Ph.D.
*David R. Atkinson Professor of Ecology
and Environmental Biology*
Cornell University

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EXHIBIT 6



Environment & Governance Group
Faculty of Arts, Design & Architecture
UNSW Sydney

Sydney NSW 2052, Australia

Phone (mobile): +61 402 940892

email: m.diesendorf@unsw.edu.au

Web: <https://research.unsw.edu.au/people/associate-professor-mark-diesendorf>

Declaration of Dr Mark Diesendorf

**Re: Expert opinion on specific questions related to Clack et al. (2017) paper,
www.pnas.org/cgi/doi/10.1073/pnas.1610381114**

I am an Honorary Associate Professor at UNSW Sydney, formerly called the University of New South Wales. My PhD is in applied mathematics/theoretical physics. Previously, at various times before my nominal retirement in 2016, I was a Principal Research Scientist in Australia's national research organization, CSIRO; Professor of Environmental Science and Founding Director of the Institute for Sustainable Futures at University of Technology Sydney; Associate Professor and Deputy Director of the Institute of Environmental Studies at UNSW Sydney; and Education Program Leader of the Australian Cooperative Research Centre for Low Carbon Living. As an author or coauthor, I have published 79 peer-reviewed journal papers, three scholarly books, 38 scholarly book chapters and 13 peer-reviewed conference papers.

From 2011 to 2016 I was a senior researcher in a research program at UNSW Sydney that performed computer simulation modelling of the operation of the Australian National Electricity Market running entirely on renewable energy. I am co-author of several peer-reviewed journal papers on this particular topic. This research is similar to that conducted on the electricity systems of the United States of America by Dr Mark Jacobson. Therefore, I have expertise in the scientific issues discussed in Dr Jacobson's and Dr Clack's journal papers published in PNAS in 2015 and 2017 respectively. I have studied both papers.

On 4 August 2020, I wrote a Declaration concerning issues surrounding the Clack et al. paper in the context of the legal case between Dr Jacobson and Dr Clack. Since then, Dr Jacobson has asked me to provide my expert opinion on additional specific questions related to Dr Clack's paper and the actions of its authors. Below are the questions and my responses (in ***bold italic***), based on my expertise as a scientist and author in the same area of study as Dr Clack and Dr Jacobson.

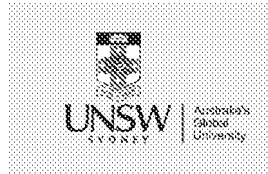
1. Is omitting data or changing the definition of data to the wrong definition an "interpretation or judgment of data" or is it "not an interpretation/judgment of data but instead altering the factual definition of data" in the following four cases:

a) Changing the definition of values in a table from average to maximum values?

This is not an interpretation/judgment of data but instead is altering the factual definition of data.

b) Omitting the inclusion of Canadian hydropower from total hydropower production?

This is not an interpretation/judgment of data but instead is altering the factual definition of data.



c) Claiming authors made a “modeling error” after wrongly assuming that data values in a paper are maximum rather than average values?

This is not an interpretation/judgment of data but instead is altering the factual definition of data.

d) Claiming authors made a “modeling error” with respect to hydropower output after omitting the fact that computer model output both in the paper and externally available to all authors shows no mathematical computer modeling error?

This is not an interpretation/judgment of data but instead is altering the factual definition of data.

2. Is an author who makes a factual mistake in a review of other people's work following due diligence or acting in reckless disregard for the truth or in bad faith when he or she

a) Fails to request clarification from the authors before publication if he or she is uncertain about an issue in the paper?

Acting in disregard for the truth and in bad faith

b) Hides the publication from a student he or she mentored and is now criticizing, until after acceptance of the paper?

Acting in bad faith

c) Refuses to correct the factual mistake when informed about it, with evidence, before publication?

Acting in reckless disregard for the truth and in bad faith

d) Refuses to correct the factual mistake when informed about it, with evidence, after publication?

Acting in reckless disregard for the truth and in bad faith

3. Is it standard practice in the sciences for authors of a paper to issue a correction to the paper AFTER publication if a material FACTUAL error is discovered in their paper?

Yes

4. Is it unethical or ethical for authors of a paper to REFUSE to issue a correction to their paper AFTER publication if a material FACTUAL error is discovered in their paper and they are requested to make a correction?

It is unethical.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on 18 September 2021.

Yours sincerely,

Mark Diesendorf PhD

Honorary Associate Professor

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EXHIBIT 7

Declaration of Dr. Anthony R. Ingraffea

My name is Dr. Anthony R. Ingraffea. I am the Dwight C. Baum Professor of Engineering, Emeritus, at Cornell University and a Distinguished Member of the American Society of Civil Engineers. I am author or co-author of over 250 peer-reviewed technical publications, including papers in the PNAS. I have been a Co-Editor-In-Chief of a peer-reviewed journal, *Engineering Fracture Mechanics*, for over 15 years. I have authored or co-authored papers related to the ongoing national energy transition, including papers co-authored by Prof. Mark Jacobson.

I am aware of the litigation filed by Dr. Jacobson and certain claims related to some of his papers published in the PNAS. I have thoroughly studied a related paper, *Evaluation of a proposal for reliable low-cost grid power with 100% wind water and solar*, PNAS, doi:1073/pnas.1610381114, 2017 (hereafter, the “Clack paper”). I am not a co-author of any of those papers, and I am commenting on them herein as an independent scholar.

On July 22, 2020, I wrote a Declaration about the Clack paper. Prof. Jacobson has now requested that I provide an expert opinion on additional questions related to that paper. Below are his questions and my answers to them:

1. Is omitting data, or changing the definition of data to the wrong definition an "interpretation or judgment of data", or is it "not an interpretation/judgment of data but instead altering the factual definition of data" in the following four cases:

a) Changing the definition of values in a table from average to maximum values?

My answer: This is clearly an instance of altering the factual definition of data.

b) Omitting the inclusion of Canadian hydropower from total hydropower production?

My answer: This is clearly another instance of apparently purposeful obscuring of the factual definition of data.

c) Claiming authors made a "modeling error" after wrongly assuming that data values in a paper are maximum rather than average values?

My answer: This is an instance where authors of the Clack paper made an incorrect inference about the model based on their own altering and obscuring of factual data.

d) Claiming authors made a "modeling error" with respect to hydropower output after omitting the fact that computer model output both in the paper and externally available to all authors shows no mathematical computer modeling error?

My answer: The unsupported inference of “modeling error” should have been obvious to the authors had they thoroughly checked for mathematical computer modeling error.

2. Is an author who makes a factual mistake in a review of other people's work following due diligence or acting in reckless disregard for the truth or in bad faith when he or she:

a) Fails to request clarification from the authors of the reviewed paper before publication if he or she is uncertain about an issue in the paper?

My answer: In this instance authors are not following due diligence expected from reviewers of scientific papers.

b) Hides the publication from a student he or she mentored and is now criticizing, until after acceptance of the paper?

My answer: This is an instance of reckless disregard for the ethics of peer-reviewed publication.

c) Refuses to correct the factual mistake when informed about it, with evidence, before publication?

My answer: This is an instance of reckless disregard for the truth.

d) Refuses to correct the factual mistake when informed about it, with evidence, after publication?

My answer: This is an instance of reckless disregard for the truth.

3. Is it standard practice in the sciences for authors of a paper to issue a correction to the paper AFTER publication if a material FACTUAL error is discovered in their paper?

My answer: Yes, definitely.

4. Is it unethical or ethical for authors of a paper to REFUSE to issue a correction to their paper AFTER publication if a material FACTUAL error is discovered in their paper?

My answer: It is unethical.

Thank you for your attention to this matter.

I declare under penalty of perjury that the foregoing is true and correct. Executed on July 20, 2021.



Anthony R. Ingraffea, Ph.D., P.E. Dist. Member ASCE

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EXHIBIT 8

Declaration of Professor Peter A. Strachan

1. My name is Peter Anderson Strachan. I am over 18 years of age and am competent to make the following declaration.
2. I have been an academic member of staff at the Robert Gordon University, Aberdeen, Scotland, since 1993. I am currently Professor of Energy Policy at the Aberdeen Business School. I was appointed Professor of Energy Policy in 2009 and subsequently appointed in 2010 to the role of Group Lead for Strategy and Policy, responsible for a research and teaching group of approximately 20 full-time and part-time academic staff. Following University re-organisation, I returned to my role as Professor of Energy Policy in 2017. My most recent publications are in prestigious peer reviewed journals.
3. As an author and co-author, I have an extensive publication record with my work focusing on the transition to 100% renewable energy in Scotland and the other countries that comprise the United Kingdom. I have edited three books and have also served as a journal Associate Editor. Further, I am an active member of five journal editorial boards. My work by invitation has been presented to the First Minister of Scotland, Holyrood, Edinburgh, Scotland. And to Members of Parliament (MPs) of the United Kingdom Parliament, Westminster, London, England. I also receive regular invitations to present at academic and industry events on renewable energy issues. A full list of articles and presentations is available on request. I have also supervised to successful completion 20 doctoral students, with a number of these on renewable energy deployment, particularly in Africa.
4. My research on renewable energy has been funded by Innovate UK and the United Kingdom Economic and Social Research Council (ESRC). The research I work on in Scotland and Europe is very similar to the work on renewable energy published by Dr Jacobson in the context of the United States. Therefore, I have specific expertise to comment on the papers published by PNAS by Dr Jacobson et al. and Dr Clack et al. in 2015 and 2017, respectively. I am familiar with both papers and have spent some time re-reading and then re-evaluating them in the context of making this statement.
5. I am aware that Dr Jacobson had initiated litigation against Dr Clack on the basis that the Dr Clack PNAS paper and resulting media coverage misrepresented the findings of Dr Jacobson's article. And further that this has had a detrimental impact on his professional reputation and wider standing in the public domain.
6. I am not a co-author, of either of the papers. I have not published with Dr Jacobson or any of the authors of the Dr Clack et al. (2017) paper and have no professional association (joint research funding or PhD supervision) with these authors. Therefore, I am offering the following statement in an independent capacity.
7. On the 10th August 2020, I wrote a Court Declaration (available on request) requested by Dr Jacobson about the Clack paper. Dr Jacobson has now requested that I provide an expert opinion on additional questions related to that paper. Below are his questions and my answers to them:
 1. Is omitting data or changing the definition of data to the wrong definition an "interpretation or judgment of data" or is it a "factual error" in the following four cases:
 - a) Changing the definition of values in a table from average to maximum values?
My Answer: This is an instance of altering the factual definition of data. With erroneous conclusions then arising. It is my perception that changing the definition of data in this way amounts to reckless / poor scholarship.
 - b) Omitting the inclusion of Canadian hydropower from total hydropower production?
My Answer: This is a further instance of altering the factual definition of data. It is my perception that the Clack paper made a reckless error in this respect. With erroneous conclusions then arising.

c) Claiming authors made a "modeling error" after wrongly assuming that data values in a paper are maximum rather than average values?

My Answer: The Clack paper makes spurious claims in this respect. There is no evidence of "modeling errors". It is my perception that this is an example of poor scholarship.

d) Claiming authors made a "modeling error" with respect to hydropower output after omitting the fact that computer model output both in the paper and externally available to all authors shows no mathematical computer modeling error?

My Answer: The Clack paper again makes spurious claims in this respect. There is no evidence of "modeling errors". It is my perception that this is an example of reckless or rash scholarship.

2. Is an author who makes a factual mistake in a review of other people's work following due diligence or acting in reckless disregard for the truth or in bad faith when he or she

a) Fails to request clarification from the authors before publication if he or she is uncertain about an issue in the paper?

My Answer: When criticising in a significant way an author's paper it is accepted custom and practice to seek clarification on the issue or issues of uncertainty or issues that are in dispute. Such criticisms may involve factual issues contained within a paper, or issues of a substantial nature related to the philosophical approach or methodology employed by an author. Failure to seek clarification from an author, especially where there is a significant rebuttal of a paper would amount to acting in disregard of the truth.

b) Hides the publication from a student he or she mentored and is now criticizing, until after acceptance of the paper?

My Answer: A situation like this is almost inconceivable. The mentor is clearly acting in bad faith and is being dishonest. And worse actively (intentionally or unintentionally) working to discredit their mentee. Professional ethics and accepted practice would dictate that the mentor be fully open and transparent in all interactions with a mentee. Clearly the mentor if he/she had concerns regarding a student's published or other work should have highlighted this as part of the mentee process. And clearly explained this to the mentee so that the mentee could avoid making such a mistake in the future. This standard would apply to both current and former mentoring relationships. In my view a mentor hiding publication activity from their mentees (current or former) where criticisms are being made of the mentee is clearly an act of poor judgement, with this potentially even amounting to gross misconduct, but that would be for an investigation committee / Court to ultimately determine.

c) Refuses to correct the factual mistake when informed about it, with evidence, before publication?

My Answer: This is clearly unethical behaviour and in contravention of accepted academic norms and values. It is fundamentally dishonest. My perception is that this amounts to gross misconduct, though again that would be for an investigation committee / Court to determine.

d) Refuses to correct the factual mistake when informed about it, with evidence, after publication?

My Answer: It would be dishonest for authors not to correct a mistake, when evidence is presented that an error has been made. Once again it is my perception that this amounts to an act of gross misconduct, though again that would be for an investigation committee / Court to determine.

3. Is it standard practice in the sciences for authors of a paper to issue a correction to the paper AFTER publication if a material FACTUAL error is discovered in their paper?

My Answer: Professional ethics and accepted practice dictates that authors should issue a proportionate correction, with an explanation, and within a reasonable timeframe after the discovery of a significant error that has been made in a published output. I would go further and state that when such an error is detected that the author (or, for that matter a whistleblower) should then refer the work to the Head of Faculty and consequently for there to be an investigation undertaken to determine the context, circumstances and to determine if any penalties should arise. Following an investigation process there is precedent in the academic community that when an author has acted recklessly or in bad faith that, that author should then request that their paper be withdrawn from the public domain, with an appropriate explanation given of the circumstances. In my view the Clack paper would fall under this category, and it should be retracted.

4. Is it unethical or ethical for authors of a paper to REFUSE to issue a correction to their paper AFTER publication if a material FACTUAL error is discovered in their paper?

My Answer: It is my perception that it is unethical for authors to refuse to issue a correction when clear errors are apparent in their paper, as is the case with the Clack paper. In my view, as outlined above professional ethics dictate that the Clack paper should be retracted. This would correct the record for all concerned and further avoid potentially reputational damage to an academic and his employer.

I declare under penalty of perjury that the following is true and correct. Executed on 17th September 2021.

Peter A Strachan

Signed: Professor Peter A. Strachan of 2 Henderson Park, Peterhead, Aberdeenshire, Scotland

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EXHIBIT 9

Declaration of Mary A. Cameron, Ph.D.

Mary A. Cameron
8050 S. Pointe Pkwy W. Apt. 2016
Phoenix, AZ 85044
maryacameron@gmail.com
(480) 330-0599

1. My name is Dr. Mary Cameron. I was a PhD student at Stanford University under Mark Jacobson from 2011 to March 2017. After, I worked as a data scientist at a Silicon Valley startup, before returning to Stanford in December 2017 as a postdoctoral scholar modeling the Arctic ecosystem. I currently work as an algorithm engineer at another Silicon Valley startup.
2. In Winter 2011, I took Optimization of Energy Systems taught by Adam Brandt. I was a top student in the class (I received an A) and we had maintained a cordial relationship. The following year, he offered me a position as teaching assistant for the course. I declined, as I had just been accepted into the PhD program and had separate funding. I did not have any significant interaction with James Sweeney or John Weyant.
3. In 2015, I co-authored the PNAS paper that later received the Cozzarelli Prize for scientific excellence. For that paper, I ran hundreds to thousands of modeling simulations and created figures and tables of their results. I also reviewed every numeric value for consistency and correctness.
4. The Clack et al. 2017 paper states that we made modeling errors. The allegations were repeated in high-impact press releases and tweets that were broadly distributed within the scientific community and to the general public. These allegations did not have any basis in fact and have now been proven as false.
5. These allegations had both short- and long-term consequences on me and my professional reputation. At the time, I had been working for less than 1 month on contract as a data scientist. Pending my performance, I would be offered full time employment. These allegations jeopardized my prospects of being offered full-time employment because of the damage to my reputation as a modeler. I spent hundreds of hours and continue to spend time responding to

these baseless allegations. I have been harassed on social media and email, and I have been forced to maintain a low profile within the scientific community. As an early career scientist, I should have been able to leverage the prestige and accomplishment of the Cozzarelli Prize to obtain a tenured academic position, which was my long-term goal. Instead, my reputation is scarred and I have had to withdraw from academia altogether. Outside of academia, this has discouraged me from pursuing a career in the energy and environmental fields, which are my greatest areas of interest. Also, because prospective employers have asked negative questions about the surrounding controversy, I have been forced to omit what should have been a crowning achievement from my resume. Beyond these professional costs, the entire ordeal and lack of any real investigation has caused me untold emotional stress.

I swear all the above to be true.

2 April 2021

[DATE]

A handwritten signature in black ink, reading "Mary A. Cameron", is written over a horizontal line.

Mary A. Cameron, PhD

**SUPERIOR COURT OF THE DISTRICT OF COLUMBIA
CIVIL DIVISION**

EXHIBIT 16

Mark Z. Jacobson, Ph.D.,	)	
	)	
Plaintiff,	)	
	)	
v.	)	2017 CA 006685 B
	)	Judge Elizabeth Wingo
Christopher T.M. Clack, Ph.D.	)	Next Court Date: None Scheduled
	)	
and	)	
	)	
National Academy of Sciences,	)	
	)	
Defendants.	)	
	)	

**DEFENDANT CHRISTOPHER CLACK’S OPPOSITION
TO PLAINTIFF’S MOTION FOR RELIEF FROM A
JUDGMENT AND TO ALTER JUDGMENT**

Defendant Christopher Clack hereby opposes Plaintiff’s motion for post judgment relief under Rules 60(b)(1)-(3) and Rule 59(e). Plaintiff has simply reargued points he has made to the Court on numerous prior occasions all of which have been previously considered and rejected. Plaintiff argues (again) that issues raised by the Clack Paper do not constitute “scientific disagreements” but instead were “bad faith,” “dishonest”, “unethical” or “reckless” misrepresentations meant to make him appear ridiculous. Plaintiff has not identified any “clear error” of fact or law and has not otherwise met any of the criteria that would justify the requested relief.

ARGUMENT

I. Defendant Cannot Meet the Requirements Under Rule 60(b) or Rule 59(e).

In order to obtain relief under Rule 60(b)(1) a plaintiff must show “mistake”, inadvertence or excusable neglect; under Rule 60(b)(2) a plaintiff must show newly discovered

evidence that with reasonable diligence could not have been discovered in time to move for a new trial under rule 59(b) and under Rule 60(b)(3) a plaintiff must show that Dr. Clack engaged in fraud relating to the proceeding. “ A motion under Rule 60(b) may not be utilized as a substitute for an appeal.” *State Farm Mut. Auto. Ins. V. Brown*, 593 A.2d 184 (D.C. 1994)(quoting *Joseph v. Parekh*, 351 A.2d 204, 205 (D.C. 1976). In order to obtain relief under Rule 59(e) the plaintiff must show a clear error of law or fact. Plaintiff makes essentially the same arguments with respect to his requests for relief under Rule 60(b) or 59(e) and has failed to establish a basis for relief..

A. Alleged Factual and Legal Errors

Plaintiff claims the following factual errors: (1) the Court did not understand the meaning of the term “scientific disagreement” and; (2) Clack’s refusal to agree with Plaintiff’s position and change the Clack Paper somehow shows the disputed issues were published in bad faith or recklessly. Plaintiff has submitted four declarations of individuals located in various parts of the world whom he proffers as experts purporting to provide “expert opinions” on the meaning of the term “scientific disagreement” and the definition of what “a fact” is. These four declarations form the entire basis for Plaintiff’s claim that the Court made clear errors of fact requiring post judgment relief. Plaintiff correctly cites the Court of Appeals holding that “neither Rule 59(e) nor rule 60(b) is designed to ‘enable a party to complete presenting [its] case after the court has ruled against it.’” *Dist. No. 1 v. Travelers Casualty*, 782 A.2d 269, 278 (D.C. 2001), but then proceeds to offer brand new “expert” declarations in purported further presentation of his case. Even if these declarations were not untimely by a matter of years,¹ they are irrelevant, repetitive

¹ There is no reasonable explanation presented as to why such “expert opinions” could not have been proffered to the Court at the time of Plaintiff’s initial submissions in this case in 2018 or even at the time of his initial motion for reconsideration filed in May of 2020. Plaintiff’s reference to the Caldeira Declaration submitted by Clack in response to Plaintiff’s first Motion for Reconsideration is misplaced. That Declaration was submitted for the sole

of arguments already made, heard and rejected by the Court and are not the proper basis of expert testimony. The meaning of the term “scientific disagreement” and whether something is or is not “a fact” are not questions that require scientific, technical, or other specialized knowledge that is outside this Court’s knowledge. Indeed, courts deal with such issues on a daily basis. Finally, the declarants conclusory opinions that the Clack authors were “dishonest,” “unethical” “acted in bad faith” etc. are completely baseless and improper. The Court provided a reasoned analysis for its rulings and its determination that the matters at issue are scientific disagreements. Plaintiff obviously disagrees with the Court’s position but the fact that he has been able to locate four individuals who apparently agree with his views to simply regurgitate the same arguments he has made throughout this litigation is not a basis for finding a clear error of fact.

B. Alleged Clear Errors of Law.

Plaintiff fares no better on his alleged clear errors of law. His first alleged error of law is that the Court held that Plaintiff was required to show that there must be an accusation of misconduct or dishonesty in order to prove defamation. Plaintiff is simply mistaken regarding the Court’s holding. The Court expressly set out the requirements for a claim of defamation and noted that where the plaintiff is a public figure (as plaintiff admittedly is) he must show the defendant acted with actual malice or reckless disregard for the truth. April Op. at 23. Further, the Court found (and Plaintiff does not dispute) that the Defendants made a prima facie showing that Plaintiff’s claims arise from protected advocacy rights shifting the burden to Plaintiff to establish he is likely to prevail on the merits. The Court’s conclusions regarding the non-defamatory nature of the statements at issue are based expressly on the Court of Appeals

purpose of rebutting and clarifying Plaintiff’s selective use of incomplete and misleading quotations attributed to Dr. Caldeira himself.

reasoning in *Competitive Enterprise Institute v. Mann*, 150 A.3d 1213 9D.C. 2016), a case Plaintiff has relied on throughout this litigation. In *Mann* the Court of Appeals clearly stated that in the context of a scientific debate statements that “take issue with the soundness of [plaintiff’s] methodology and conclusions [are] protected by the First Amendment. *Id.* at 1242. This Court based its decision squarely on this holding in *Mann*.² This Court then went on to distinguish the facts of this case from the *Mann* court’s further holding that statements that “are personal attacks on an individual’s honesty and integrity and assert or imply as fact that [plaintiff] engaged in professional misconduct and deceit to manufacture the results he desired, if false, do not enjoy First Amendment protection.” *Id.* The Court concluded--and explained in detail the reasons why—the Clack Paper’s statements could not reasonably be read as such “personal” attacks.³ The Court’s April 20, 2020 opinion is based on controlling Court of Appeals precedent and Plaintiff has not identified a “clear error of law.” Finally Dr. Jacobson seems to argue that because large parts of the press appeared to side with the Clack Paper authors’ views with respect to the scientific disagreements he was made to appear “odious,” “infamous” or “ridiculous.” As noted above, based on a thorough review of the record the Court concluded that none of the statements were directed at Dr. Jacobson himself or sought to make him look odious etc. Obviously, the reaction of the scientific community to the relative merits of the arguments is not a basis for defamation.⁴

² April 20, 2020 Opinion at 24 – 25 (“The Court has reviewed the Complaint, the motion and the related pleadings as well as the attachments thereto, and finds that the three asserted “egregious errors” are statements reflecting scientific disagreements, which are appropriately explored and challenged in scientific publications;...”

³ *Id.* (“[T]hey simply do not attack Dr. Jacobson’s honesty or accuse him of misconduct.”); see also n.11 detailing the specific claims and the Court’s analysis).

⁴ Dr. Jacobson includes a number of quotes in which he appears to assert that the mistakes pointed out by the Clack authors imply he “is stupid” “incompetent”, “deserving to be laughed at” etc. (Pl. Brief at p. 13) Again, as the Court found none of those statement can reasonably be read into the scientific analysis in the Clack Paper.

Plaintiff's second alleged error of law claims the Court should have provided him more of a benefit of the doubt and improperly dismissed his claim because "multiple sets of facts support Plaintiff's case." This simply repeats the arguments above that the Court made factual errors relating to the meaning of "scientific disagreement", did not adequately address the evidence and applied the wrong defamation law.

Plaintiff has failed to meet his burden under Rule 60(b) or Rule 59(e).

Conclusion

For the reasons set forth above, the Court should deny Plaintiff's Motion for Relief From Judgment and to Alter a Judgment.

Dated: October 6, 2021

Respectfully submitted,

/s/ Drew W. Marrocco

Drew W. Marrocco (D.C. Bar No. 453205)
Clinton A. Vince (D.C. Bar No. 223594)
1900 K Street, N.W.
Washington, D.C. 20006
Telephone No. (202) 496-7500
Facsimile No. (202) 496-7756
drew.marrocco@dentons.com

Counsel for Defendant
Christopher T.M. Clack, Ph.D.

CERTIFICATE OF SERVICE

I hereby certify that on this 6th day of October, 2021, I caused the foregoing Opposition to Plaintiff's Motion for Relief From Judgment and to Alter A Judgment, to be served via CaseFileXpress on the following:

Mark Z. Jacobson
946 Valdez Place.
Stanford CA 94305

Eveangeline C. Paschal
HUNTON ANDREWS KURTH LLP
2200 Pennsylvania Avenue, N.W.
Washington, D.C. 20037

/s/ Drew W. Marrocco
Drew W. Marrocco

IN THE SUPERIOR COURT
FOR THE DISTRICT OF COLUMBIA

EXHIBIT 17

MARK Z. JACOBSON, Ph.D.,

Plaintiff,

v.

CHRISTOPHER T. M. CLACK, Ph.D.,

and

NATIONAL ACADEMY OF SCIENCES

Defendants.

C. A. No. 2017 CA 006685 B

Judge Elizabeth Wingo

Next Court Event: None Scheduled

**PLAINTIFF MARK Z. JACOBSON'S REPLY
TO OPPOSITION TO MOTION FOR RELIEF/ALTERATION OF JUDGMENT**

Plaintiff's Sep. 24, 2021, Motion provides the correct definition of a *scientific disagreement*. Meticulous analyses by four sworn Experts show Dr. Clack and NAS gave the Court a false meaning of the term and published false facts. Defendant provides no evidence countering the definition of a *scientific disagreement* and has never provided a source of his own definition. His refusal to correct his false definition and false facts even after four Experts in his field declare them false proves again malice in front of the Court. Defendant says the Expert testimonies are "*irrelevant*." He must say this because they show he and NAS misled the Court. But the purpose of Experts is to assist the Court, so it is for the Court to decide their value.

Here, Plaintiff presents new cases showing (a) a false claim of error in Plaintiff's professional work is defamatory since it imputes to him "*incompetence in his trade*"; (b) *Mann* clearly supports this conclusion; (c) Dr. Clack has shown three types of malice, including intent

and motive to discredit and four lies in his paper and (d) the tests of whether a sentence is factual are if it is “*susceptible to proof or refutation by reference to concrete, provable data*” or “*implies a provably false fact.*” **These tests were not previously applied to the sentences at issue here.**

FALSE CLAIMS A PROFESSIONAL MADE MISTAKE ARE DEFAMATORY

In *Gould v. Maryland Sounds Ind., Inc.* [(1995) 31 Cal.App.4th 1137, 1154], the Court ruled that a factually false statement claiming a professional made a mistake is defamatory **even if it does not impute dishonesty or misconduct** because it imputes “*to him incompetence in his trade.*” In that case, an estimator was accused of making an error in a bid. The Court determined,

"We reach a different conclusion as to Leister's accusation Gould made a \$100,000 mistake in estimating an MSI bid. This statement would tend to injure Gould by imputing to him incompetence in his trade." (citations omitted)

Thus, Gould’s honesty/integrity were not directly impugned. He was falsely accused of erring as a professional, thus defamed. The **exact situation arose here**. Plaintiff was falsely accused of many professional (computer modeling) errors. NAS admits D.C. mimics California law on this:

“The elements of a defamation claim are similar in California: libel is ‘a false and unprivileged publication by writing... which exposes any person to hatred, contempt, ridicule, or obloquy,... or which has a tendency to injure him in his occupation’ (Nov 27, 2017 NAS Memorandum at 9)

Mann [150 A.3d 1213 (DC 2016)] also clearly supports the *Gould* finding. *Mann* first says a statement defames “*if it tends to injure [the] plaintiff in his trade, profession*” which is what *Gould* found for false claims of professional error (same types of false claims as here). *Mann* then says,

“The statement ‘must be more than unpleasant or offensive; the language must make the plaintiff appear ‘odious, infamous, or ridiculous.’”

“*Ridiculous*” means “*stupid or unreasonable and deserving to be laughed at.*” “*Infamous*” means “*famous for something considered bad*” (Cambridge Dictionary). By imputing Plaintiff, a modeler-by-profession for ~32 years, as *incompetent*, Dr. Clack caused him to appear *stupid, deserving to be laughed at*, and *famous for something considered bad*. Thus, *Mann* implies defamation here.

For both quotes, *Mann* references *Howard Univ v Best* [484 A.2d 958 989 (D.C. 1984)], which says a defamatory meaning must be determined only after a publication is “*considered as a whole in the sense in which it would be understood by the readers to whom it was addressed.*” That case refers to *Johnson v. Johnson Pub. Co.* [271 A.2d 696 (1970)], which says words must be read without ignoring “*their implications*” or “*their context.*” That case refers to *Garipey v. Pearson* [207 F.2d 15 (DC Cir. 1953)], which gives examples of how context matters. E.g.,

“The words “Smith got rich fast” would not imply corruption, but the words “Smith got rich fast while he was a tax assessor” might.”

Here, the false fact “*In fact, the flexible load used by LOADMATCH is more than double the maximum possible value from table 1 of ref. 11*” combined with “*We note several modeling errors...that invalidate the results...*” imputes Plaintiff to be an incompetent computer modeler (*Gould, supra*). Same with “*This error is so substantial...*” combined with the model error claim. The resulting smears in news articles and social media prove the harmful “*implications,*” thus defamatory nature of the statements (*Johnson; Howard, supra*), as concurred by Experts (Exh 1,4, Sep 24, 2021 Motion).

DR. CLACK’S INTENT AND MOTIVE TO DISCREDIT

“*Shame the work by similar authors, on grid reliability, was discredited*”(Aug 24,2017 Clack tweet-Exh 30 Sep 29, 2017 Complaint & Exh 1). This unprovoked smear by Dr. Clack of Plaintiff’s different paper shows Dr. Clack’s intent to discredit Plaintiff. His motive was envy of attention Plaintiff was receiving (Exh 2). Actual malice is “*a state of mind arising from hatred or ill will, evidencing a willingness to vex, annoy or injure another person*” [*Brown v Kelly* (1989) 48Cal3d 711,723]. Dr. Clack’s malice in context (*Johnson, supra*) with the false facts prove defamation.

Actual malice also arises because Dr. Clack had “*knowledge that [the statement] was false*” [*Thompson v Armstrong*, 134 A.3d 305,311 (DC 2016)]. Dr. Clack knew his claim, “*This error is so substantial, we hope there is another explanation...*” contained two lies. He knew (1)

what the explanation was, so pretending he didn't was a lie, and (2) he had no evidence of error because he knew the high hydropower discharge rate was an assumption: "*I am not disagreeing with the possibility that it can be done with...hydro...*" (Mar 2, 2016 email; Exh 4, Sep 29, 2017 Complaint). He then compounded his lies with two more in "*One possible explanation for the errors in the hydroelectric modeling...*" The lies are (3) suddenly MULTIPLE hydro modeling errors arose when he had no proof of one, and (4) he knew the exact, not possible, explanation. Thus, Dr. Clack lied four times in two sentences to **discredit** Plaintiff, which was his purpose (Exh 1). The sentences in context (*Gariepy*) with his lies and motive (Exh 2) are defamation.

The third type of malice is refusal to investigate properly and correct when given evidence. The Supreme Court says defamation arises upon "*extreme departure from the standards of investigation and reporting ordinarily adhered to by responsible publishers.*" The paper

"...had published the story without any independent support for his affidavit; that it did not, before publication, view his notes...; that the magazine did not interview a person with Burnett..., view the game films, or check for any adjustments..." [Curtis Pub. Co. v Butts (1967) 388 US 130]

Experts find Dr. Clack did not do due diligence and recklessly disregarded truth, which is malice.

WHAT CONSTITUTES A STATEMENT OF FACT

The tests for determining if a statement is factual are whether it is "*susceptible to proof or refutation by reference to concrete, provable data*" [Gould, *supra*] and "*whether a reasonable juror could conclude that...statements expressed or implied a verifiably false fact.*" [Dominion, v. Powell, Civil Action 1:21-cv-00040 (CJN) (DDC Aug. 11, 2021); *Rosen v. Amer. Israel Public Affairs Com., Inc.*, 41, A.3d 1250 (DC 2012)]. In *Dominion*, the Court reeled off examples:

"These statements are either true or not; either Powell has a video... or she does not... either Dominion was created to produce altered voting results... or... it was not... either Dominion did so or... it did not. In sum, Dominion has adequately alleged that Powell made a number of statements that are actionable because a reasonable juror could conclude that they were either statements of fact or statements of opinion that implied or relied upon facts that are provably false."

Using these tests, we consider Defendant's statements brought up in the Sep 29, 2017 Complaint:

- (1) “In fact, the flexible load used by LOADMATCH is more than double the maximum possible value from table 1 of ref. 11. The maximum possible from table 1 of ref. 11 is given as 1,064.16 GW, whereas figure 3 of ref. 11 shows that flexible load (in green) used up to 1,944GW (on day 912.6). Indeed, in all of the figures in ref. 11 that show flexible load, the restrictions enumerated in table 1 of ref. 11 are not satisfied.” (P.18)
- (2) “This error is so substantial that we hope there is another explanation for the large amounts of hydropower output depicted in these figures.” (P. 21)
- (3) “...generation proposed in ref. 11 is 402.2 TWh, 13% higher than the 25-y historical maximum of 356.5 TWh (1997)...” (P. 29)
- (4) “We note several modeling errors presented in ref. 11 that invalidate the results...” “...contained modeling errors...” “...have been modeled in erroneous ways and that these errors alone invalidate the study and its results...” (On P. 18, 20, 21, 23 of Sep. 29, 2017 Complaint refers to false claims of “model error” due to false claims (1) and (2).

These are all statements of fact because (1) values in Table 1 are either maximum or not; (2) a hydro computer model error either occurred or not; (3) Plaintiff either includes Canadian hydro or doesn't; and (4) the model either produced errors due to (1) and (2) or didn't. **Even if Statement 2 is an opinion, it implies a provably false fact (that an error occurred)**, so is actionable [*Rosen, Mann, supra*]. All experts concur the statements are factual [e.g., “*numbers in Table 1 are either max...or...average.*” (Exh 3, Sep. 24, 2021 Motion)]. Evidence in all Plaintiff's briefs, including Exhibits 1-8 of the Sep. 24, 2021 Motion, prove the facts are false.

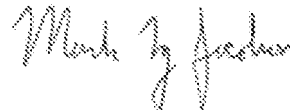
CONCLUSION

Defendant's statements were of fact since they are “*susceptible to proof or refutation*,” defamatory because they impute “*incompetence in [Plaintiff's] trade*” and make him appear “*odious, infamous or ridiculous*,” and malicious for three reasons. Thus, the Court is asked to VACATE its fee order.

Respectfully submitted,

Date: October 10, 2021

Mark Z. Jacobson



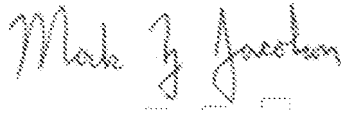
Mark Z. Jacobson, Pro Se
946 Valdez Place, Stanford, CA 94305
(650) 468-1599; jacobson@stanford.edu

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a copy of foregoing was served via Case File Xpress this 24th
day of September 2021 on:

Evangeline C. Paschal Esposito, Esq.
Hunton Andrews Kurth LLP
2200 Pennsylvania Avenue, N.W.
Washington, D.C. 20037
Counsel for Defendant
National Academy of Sciences

Drew W. Marrocco, Esq.
Clinton A. Vince, Esq.
Dentons US LLP
1900 K Street, N.W.
Washington, D.C. 20006
Counsel for Defendant
Christopher T.M. Clack, Ph.D.

A handwritten signature in cursive script, appearing to read "Mark Z. Jacobson".

Mark Z. Jacobson

EXHIBIT 1

← Tweet



Andrea VassalloMeyer
@andreamv

...

Are you an @NPR listener? Care about the environment? My friend @mzjacobson is talking today 3pm EST/2pm CST



Mark Z. Jacobson @mzjacobson · Aug 24, 2017

Speaking on @NPR @SciFri at noon Pacific Time to talk about 139-country roadmaps cell.com/joule/fulltext... @StanfordWoods @100isNow @Joule_CP

9:29 AM · Aug 24, 2017 · Twitter Web Client



Tweet your reply

Reply



Mark Z. Jacobson @mzjacobson · Aug 24, 2017

Replying to @andreamv and @NPR

Thanks, Andrea. Actually on Friday :)

...



1



2



Andrea VassalloMeyer @andreamv · Aug 24, 2017

Oops. I guess I have promote it for another day!

...



Dr Christopher T M Clack, PhD @DrChrisClack · Aug 24, 2017

Replying to @andreamv @NPR and @mzjacobson

Shame the work by similar authors, on grid reliability, was discredited: pnas.org/content/114/26...

...



2



EXHIBIT 2



Leonardo DiCaprio ●

@LeoDiCaprio

Following ✓

Read @MZJacobson's piece on renewable energy and the plan to transition to 100% by 2050: beforetheflood.com/explore/the-so...

11:43 AM · 3 Nov 2016

2,200 Retweets 5,122 Likes



251



4.2K

5.1K



Tweet your reply



Christopher Clack · @chucky007 · 3 Nov 2016 ✓

Replying to @LeoDiCaprio

.@LeoDiCaprio Why not read my piece on the most cost effective way to remove carbon: theconversation.com/the-cheapest-w... #renewableenergy #climatechange

The cheapest way to scale up wind and solar energy? High-tech po...

The U.S. could dramatically increase solar and wind power without expensive energy storage. The key is to overlay high-voltage direct curr...

theconversation.com



4



0



Steve Bloom · @steviebloom55 · 3 Nov 2016 ✓

So hmm, relative to what @mzjacobson has already done, this is a specific HVDC grid configuration with added efficiencies?

Declaration of Mary A. Cameron, Ph.D.

Mary A. Cameron
8050 S. Pointe Pkwy W. Apt. 2016
Phoenix, AZ 85044
maryacameron@gmail.com
(480) 330-0599

1. My name is Dr. Mary Cameron. I was a PhD student at Stanford University under Mark Jacobson from 2011 to March 2017. After, I worked as a data scientist at a Silicon Valley startup, before returning to Stanford in December 2017 as a postdoctoral scholar modeling the Arctic ecosystem. I currently work as an algorithm engineer at another Silicon Valley startup.
2. In Winter 2011, I took Optimization of Energy Systems taught by Adam Brandt. I was a top student in the class (I received an A) and we had maintained a cordial relationship. The following year, he offered me a position as teaching assistant for the course. I declined, as I had just been accepted into the PhD program and had separate funding. I did not have any significant interaction with James Sweeney or John Weyant.
3. In 2015, I co-authored the PNAS paper that later received the Cozzarelli Prize for scientific excellence. For that paper, I ran hundreds to thousands of modeling simulations and created figures and tables of their results. I also reviewed every numeric value for consistency and correctness.
4. The Clack et al. 2017 paper states that we made modeling errors. The allegations were repeated in high-impact press releases and tweets that were broadly distributed within the scientific community and to the general public. These allegations did not have any basis in fact and have now been proven as false.
5. These allegations had both short- and long-term consequences on me and my professional reputation. At the time, I had been working for less than 1 month on contract as a data scientist. Pending my performance, I would be offered full time employment. These allegations jeopardized my prospects of being offered full-time employment because of the damage to my reputation as a modeler. I spent hundreds of hours and continue to spend time responding to

these baseless allegations. I have been harassed on social media and email, and I have been forced to maintain a low profile within the scientific community. As an early career scientist, I should have been able to leverage the prestige and accomplishment of the Cozzarelli Prize to obtain a tenured academic position, which was my long-term goal. Instead, my reputation is scarred and I have had to withdraw from academia altogether. Outside of academia, this has discouraged me from pursuing a career in the energy and environmental fields, which are my greatest areas of interest. Also, because prospective employers have asked negative questions about the surrounding controversy, I have been forced to omit what should have been a crowning achievement from my resume. Beyond these professional costs, the entire ordeal and lack of any real investigation has caused me untold emotional stress.

I swear all the above to be true.

2 April 2021

[DATE]

A handwritten signature in cursive script that reads "Mary A. Cameron". The signature is written in black ink and is positioned above a horizontal line.

Mary A. Cameron, PhD

EXHIBIT 19

Subject: RE: Question
From: Kathy McClelland <kathymcc@stanford.edu>
Date: 10/17/17, 1:28 PM
To: Mark Z Jacobson <jacobson@stanford.edu>, "Kathy.McClelland@stanford.edu" <Kathy.McClelland@stanford.edu>

Hello Mark,
Please see my responses **below**. Let me know if you have other questions.
Kathy

-----Original Message-----

From: Mark Z. Jacobson [mailto:jacobson@stanford.edu]
Sent: Monday, October 16, 2017 3:29 PM
To: Kathy.McClelland@stanford.edu
Subject: Question

Hi Kathy,

Thanks for talking the other day. I have a quick question about filing a misconduct claim.

I will be filing it, but my question is whether either my former students (who are no longer at Stanford but graduated) and/or my other coauthor (who is a researcher at U.C. Berkeley) can join in the claim or is it required to be limited to a Stanford person? **Filing an allegation is not limited to a Stanford person, but in order for Stanford to conduct the review, the person(s) who are alleged to have committed research misconduct must have done so under the purview of Stanford.**

Similarly, could I file a claim at U.C. San Diego against one of the authors, who works there, or do these research misconduct claims need to be filed only by people currently employed at the institution? **Yes, you could file a claim against a person at another institution, again, as long as that person (allegedly) committed the research misconduct while at that institution.**

The reason is that all coauthors were harmed.

Thanks,

Mark

--

Mark Z. Jacobson

Professor of Civil and Environmental Engineering

Director, Atmosphere/Energy Program Phone: 650-723-6836

Stanford University Fax: 650-723-7058

Yang & Yamazaki Environ. and Energy Bldg jacobson@stanford.edu

473 Via Ortega, Room 397 Twitter: @mzjacobson

Stanford, CA 94305-4020 www.stanford.edu/group/efmh/jacobson/

Dear President Tessier-Lavigne,

I am writing in support of Dr. Jacobson's letter, and hope to offer a different perspective on how the Clack et al. 2017 paper affected me personally and professionally. I imagine there have been considerable efforts at Stanford to protect students and researchers involved, and for that I am truly grateful. At the same time, after that explosive summer, I wonder now if my decision to keep my head down made it too easy for those in power to forgive actions that I still do not understand, and certainly do not forgive. Thankfully, time has helped calm the media frenzy, but it has done nothing to answer the questions I had in 2017 about how the Clack et al. paper was published in the first place. As a graduate student at Stanford, a public assertion that a paper I had worked on was "riddled" with modeling errors was profoundly damaging to my credibility and prospective career. Without forewarning from the co-authors that this critique was being written, opportunities I could have scheduled before their release date were permanently lost. Subsequently, Stanford's silence on this issue after several authors admitted wrongdoing only added to the public dialogue that my coauthors and I were lashing out in anger, and not in defense of what we knew to be correct. I am writing because, while I recognize that I do not know what motivated the Clack et al. authors to behave in the ways they did, my experiences raise several professional and ethical red flags that warrant further questioning. Private conversations and public admissions from Clack et al. authors make me strongly suspect there was malicious intent from some researchers looking to advance their careers, and others willing to overlook abuse of the scientific publication process to achieve their end goals.

Initially, I was puzzled as to how the Clack et al. paper passed through 21 researchers and peer review when it is peppered with inflammatory statements, several of which are easy to disprove. The public discourse surrounding these papers focused on hydroelectric power — one of four major criticisms in the Clack et al. 2017 paper. Dr. Jacobson's letter highlights the inconsistencies between what Clack et al. wrote about our work, and what they later admitted to knowing about our work. It is frustrating that this point in particular was given so much attention by the scientific community and the media, as it is more or less a debate on which metric was reported in a table, but it is not a straightforward explanation to those outside the field. Our use of the metric is correct as we wrote it, which is a conclusion you could derive using data from the published figures in the paper, or from the raw model output. Instead, the Clack et al. authors interpreted it to mean something else, and wrote a lengthy analysis deriving from that misinterpretation.

If we had been wrong and made the error they claimed, an email catching the error would have been welcomed, and we would have issued a correction with updated values. But it would not be anywhere near the scale of importance it was made out to be. For perspective, we received the PNAS Cozzarelli Prize (paper of the year) for our study demonstrating that it is possible to meet U.S. energy demand with renewables. In certain situations, we modeled the use of hydroelectric power because it was cheaper than other resources, but it was not an irreplaceable component. I personally ran hundreds of simulations that showed a robust solution space. Had we been wrong, using batteries instead would have shifted the costs (by <1%), but would not have invalidated our major conclusions.

Another of their major criticisms that, as far as I know, was never addressed, claims that GATOR-GCMOM, the weather and climate model we use to run simulations, has never been evaluated or inter-compared with other models. This was ridiculous to me, not only because model evaluation is my particular area of expertise, but also because there are dozens of publications evaluating GATOR-GCMOM performance listed on Dr. Jacobson's public website (<https://web.stanford.edu/group/efmh/jacobson/vita/index.html>). It is too obviously incorrect, and too easily disprovable, that I was astounded it could pass the rigorous peer review and publication standards of a journal like PNAS, in

addition to all the authors cosigning the veracity of their manuscript.

On these points, it is easy to see how misunderstandings could be an excuse for some authors who were naive to the field. It's also easy to see how the whole thing could have been avoided with a single email. This is the logic that baffled me in June 2017, because the upheaval was so incredibly avoidable. As a computer modeler and coauthor of the 2015 paper, I was qualified to address several of the criticisms in the Clack et al. 2017 paper, and had done so in lectures and other publications that would have been easy to share. Adam Brandt would have known that this is my specific strength, as I had taken his energy optimization course several years before and performed well enough that he had later offered me a TAship. We chatted a few times a year when we ran into each other at seminars or on campus, and were always friendly with one another. There is no reason that's clear to me why he would not feel comfortable asking me anything about our 2015 paper, in person or over email. Similarly, Jim Sweeney and John Weyant had offices across the hall from my PhD office, and had to have walked directly by my door countless times while I was there. Though we did not know each other personally, my name was undoubtedly visible to them every time they left their offices. My co-author and former lab mate, Bethany (Frew) Corcoran, had all 3 on her PhD committee. In the 2+ years that had passed between our 2015 paper and their 2017 response, it would have been easy to get answers.

It was when I learned about the email exchange Christopher Clack had with Jacobson months before the publication that my perspective on the situation shifted, and I stopped believing this was about science. Christopher Clack knew exactly what we meant in 2015, because he had emailed for clarification and received the answer that would discredit the underlying assumption of his paper. An old gmail search showed that he had added me as a connection on LinkedIn not long after. Christopher Clack went out of his way to obtain the means to contact me, and yet he didn't. I find it preposterous to think this could have been an innocent mistake. I also find it unlikely that 20 additional authors signed on to a piece predicated on this information, unless they were not informed of the email exchange, and possibly lied to about the communication. It also seems unlikely that a junior scientist could gather that many big name researchers on his own, especially given the inflammatory nature of the piece. I'd be very interested in hearing that story. I supported Jacobson's lawsuit against Clack because there is material evidence that he is lying about what he knew, and that information needs to be public because it is dangerous to scientific integrity. Restating the facts in another light, an unknown junior scientist leads a paper "taking down" the authors of an award-winning PNAS paper. In response, he is now a leader in the field, and the energy modeling consulting company he started is gaining more and more visibility.

Conversely, I fell pretty hard. This paper that claimed sloppy modeling was published as I was looking for jobs in climate, energy, and air pollution modeling. This was only weeks after Scott Pruitt had taken over the EPA and stopped all new grants and contracts, the federal government was on a hiring freeze, and the Trump administration was purging climate scientists from federal agencies. It was already a huge challenge finding places that were hiring, let alone ones that would interview me after learning I was involved in what one researcher dubbed "WWSgate". Overcoming gender bias in tech is a separate challenge, but at some point, it doesn't matter how many Stanford degrees you have in math and computers if there are a bunch of Stanford professors saying you're bad at math and computers. While I'm sure this timing wasn't intended, I was paycheck-to-paycheck at the time (not unusual for a PhD student), and the stress over bad timing could have been avoided had any of the authors reached out to inform me of their work. If nothing else, I could have been looking for a job while they were writing, instead of assuming I'd have time later. The short notice we did receive (from the journal) came as I was lining up initial interviews, and strongly contributed to me accepting the first "job" I was offered – hourly contract work as a data scientist in e-commerce – instead of something related to the subjects in which I'd not only published, but also taught at Stanford.

Then, in October 2017, I was a witness to sexual harassment and assault at that same company, and

needed to find a new job immediately. That same week, news of Dr. Jacobson's lawsuit was becoming public, which unearthed a fresh wave of public backlash, and further mischaracterization of what the lawsuit was actually about. As I was then trying to navigate the criminal and civil court system while protecting an abuse victim from further retaliation, my capacity for engaging on that front was nonexistent. A Stanford professor with knowledge of the Clack et al. situation notified me of a postdoc position, to which I eventually applied. I was offered the position and accepted it, and am glad I did. My postdoc ended July of this year, and I am now at a new position where I am learning techniques I think will better help me respond to future climate disasters. This, I think, is the happiest ending that could have come from the situation, but I can't help but think this is where I should have been in 2017. I took the postdoc position for a number of reasons, but a major one was that I believed it would be the only way I could get hired in science or academia, because I've worked with people who can confirm I am a competent modeler. Before 2017, I wanted to be a data scientist in the renewable energy sector, and later an adjunct engineering professor. I still hope to teach, and hope that with enough time, an internet search of my CV doesn't unearth contradictory national news headlines. In the meantime, I have done enough job interviews to know that my best route is avoiding this topic entirely. I no longer list the PNAS award on my resume, because I won't get an interview if it's googled. Ultimately, when it comes to my word versus that of the Clack et al. authors, it sounds insane to say that I was right, and 21 academics were wrong but didn't bother to ask us about it before publishing. Their clout undermines mine, in the field in which I am most accomplished. I don't see this changing, and so I have had to move on to another field.

In retrospect, there are certainly things I would have done differently to deescalate the situation, but I don't think it would have changed where we are now. I did reach out to other professors for help. I met with the Ombudsman for help. Based on these interactions, I trusted that Stanford would look into it, and that the people who decided to create this upheaval while under Stanford's roof would be disciplined appropriately within the abilities of the university. Of course I understand tenure and academic freedom, but that is not what this was about. This was about ethical and professional integrity, and whether or not malice goes unpunished if it's cloaked in enough ambiguity. After two years, I again find myself spending hours of unpaid personal time explaining this situation in the hopes that someone with a voice will speak truth to power, and with little faith anything will change. What has changed is that I lost several years and \$100k/yr in salary in order to restart my career. Christopher Clack has replaced me in my field. Jim Sweeney, John Weyant, and David Viktor have collected tens of thousands of dollars from Trump administration as expert witnesses in a climate change lawsuit. Their defense hinges on the claim that 100% renewable energy is impossible (http://blogs2.law.columbia.edu/climate-change-litigation/wp-content/uploads/sites/16/case-documents/2018/20181015_docket-615-cv-1517_na-1.pdf). Ken Caldeira is still baiting Mark with banal tweets about suing over science every few months. Adam Brandt was awarded tenure.

Regardless of whether or not they believed what they authored, there are simple efforts the Stanford authors could have taken to reduce the negative impacts on me and on the University's reputation. Instead, it appears to me as though decisions were made that would maximize publicity and elevate their personal brands. When several Clack et al. authors admitted through various means that they were wrong, there was no higher authority questioning whether they knew at the time that they were publishing incorrect information, or whether they were grossly negligent in their scientific publications.

I recognize that this was an intensely vulnerable time in my life, and the betrayal and humiliation I felt from people I once admired is something I cannot disentangle from discussion of the events. I imagine you have spent considerable time learning the different sides of this story, and I am grateful for it. Stanford was my home for 10 years, and I hold myself to a higher standard still, knowing that my conduct represents my institution, whether I like it or not. I don't believe the Clack et al. co-authors acted with integrity when they represented Stanford, and the sense of injustice I feel over it is hard to shake. I became collateral because the people who chose for this paper to be published did not consider the consequences.

Stanford's reputation, too, became collateral. Good people were pulled from their jobs and research to pick up the pieces, and I don't see how it won't happen again. I hope that this letter has given you a different view of the situation, and welcome you to reach out if you would like further information. Thank you for taking the time to listen — it is truly appreciated.

Sincerely,

A handwritten signature in black ink that reads "Mary Cameron". The script is fluid and cursive, with the first name "Mary" and last name "Cameron" clearly distinguishable.

Mary A. Cameron

T: 480-330-0599

maryacameron@gmail.com

EXHIBIT 21 - Details of Legal Fee Bills



30 SOUTH 17TH STREET, 19TH FLOOR
PHILADELPHIA, PA 19103
(215) 564-1700
EIN:23-2639443

February 14, 2018

Billed through 01/31/2018

Bill Number 222943

Jacobson, Dr. Mark Z.
946 Valdez Place
Stanford, CA 94305

Client No. 54544
Matter No. 00001
Billing PST

Balance of last bill dated: 01/05/2018 \$22,210.95

Payments received since last bill 10,000.00

Net balance forward \$12,210.95

Pursuit of Retraction from PNAS (Proceedings of National Academy of Sciences) and Potential Collateral

FOR PROFESSIONAL SERVICES RENDERED

01/01/2018	KSK	Brief review of Carl Engel's insert regarding breach of contract and promissory estoppel; draft email to Carl Engel; review cases; draft Opposition to Special Motion to Dismiss	2.50 hrs	225 /hr	562.50
01/02/2018	PST	Internal confs re oppositions to motion to dismiss. Legal research.	1.70 hrs	275 /hr	467.50
01/02/2018	KSK	Continue drafting opposition to Motions; review cases; office conference with Paul Thaler; telephone conference with Jon Cass and Carl Engel	10.50 hrs	225 /hr	2,362.50
01/02/2018	CLE	Telephone call with co-counsel regarding motion to dismiss	0.30 hrs	225 /hr	67.50
01/03/2018	JZC	Attorney conference with Karen Kalas and Carl Engel re: strategy related to Response Brief and how to handle page limit.	0.20 hrs	275 /hr	55.00
01/03/2018	PST	Review and revise opposition. Internal confs. Legal research.	3.70 hrs	275 /hr	1,017.50
01/03/2018	KSK	Legal research; continue drafting opposition to motions to dismiss; draft email to Paul Thaler, Jon Cass and Carl Engel; draft emails to Dr. Jacobson	8.30 hrs	225 /hr	1,867.50
01/04/2018	PST	Revisions to oppositions to special motions to dismiss; numerous internal confs; telephone calls with opposing counsel; legal research.	6.70 hrs	275 /hr	1,842.50
01/04/2018	KSK	Draft Oppositions to Motions to Dismiss; office conferences with Paul Thaler; telephone conference with Carl Engel and Jonathan Cass	12.00 hrs	225 /hr	2,700.00
01/04/2018	CLE	Legal research regarding the standard for deciding a Rule 12(b)(6) motion as to claims for breach of contract and promissory estoppel	0.70 hrs	225 /hr	157.50

Bill Number	54544	00001	222943			
01/05/2018	JZC	Reviewed and made proposed revisions and comments to draft Omnibus Motion; attorney conference with Karen Kalas to discuss comments; reviewed and revised draft Motion for targeted discovery.	4.10 hrs	275 /hr		1,127.50
01/05/2018	PST	Final revisions to briefs and motion. Numerous internal confs. Prepare for filing.	7.10 hrs	275 /hr		1,952.50
01/05/2018	KSK	Finalize Oppositions to motions to dismiss; draft email to Judge Wingo's chambers; draft emails to Carl Engel and Jonathan Cass	10.00 hrs	225 /hr		2,250.00
01/05/2018	CLE	Draft proposed orders denying special motions to dismiss	0.40 hrs	225 /hr		90.00
01/05/2018	CLE	Finalize motion for leave to take discovery	1.20 hrs	225 /hr		270.00
01/08/2018	KSK	Draft letter to Judge Wingo; draft emails to opposing counsel; review Praecipe regarding exhibit	1.00 hrs	225 /hr		225.00
01/09/2018	KSK	Review and respond to email from Dr. Jacobson	0.30 hrs	225 /hr		67.50
01/19/2018	PST	Review opposition to motion for discovery. Internal confs.	0.70 hrs	275 /hr		192.50
01/26/2018	PST	Email to/from opposing counsel. Conf with KK. rev. reply briefs.	1.50 hrs	275 /hr		412.50
01/26/2018	KSK	Review NAS Opposition to Motion for Leave to take limited discovery	0.10 hrs	225 /hr		22.50
01/29/2018	PST	Emails to/from client. Conf with KK. Rev. pleadings.	0.70 hrs	275 /hr		192.50
01/29/2018	KSK	Review and respond to emails from Dr. Jacobson	0.30 hrs	225 /hr		67.50
01/31/2018	PST	Rev. judge's rules. Conf with KK.	0.40 hrs	275 /hr		110.00
		<i>Fee Recapitulation</i>				
		Engel, Carl L	2.60 hrs	225.00 /hr		\$585.00
		Cass, Jonathan A.	4.30 hrs	275.00 /hr		\$1,182.50
		Karas, Karen S.	45.00 hrs	225.00 /hr		\$10,125.00
		Thaler, Paul S.	22.50 hrs	275.00 /hr		\$6,187.50
		Total fees for this matter	74.40 hrs			<u>\$18,080.00</u>

DISBURSEMENTS

01/01/2018	DC eFiling Fee for Opposition to Motion (Dr. Clack) - PST	16.38
01/01/2018	DC eFiling Fee for Opposition to Motion (Nat'l Academy of Sciences) - PST	16.38
01/01/2018	DC eFiling Fee for Motion for Leave to Take Targeted Discovery - PST	36.88
01/31/2018	Legal research Westlaw/Online	325.41
01/31/2018	Ribstone Scanning Bates or Printing	11.40
	Total disbursements for this matter	<u>\$406.45</u>

BILLING SUMMARY

Engel, Carl L	2.60 hrs	225.00 /hr	\$585.00
Cass, Jonathan A.	4.30 hrs	275.00 /hr	\$1,182.50

Jacobson, Dr. Mark Z.

Bill Number

54544

00001

222943

Page

3

Karas, Karen S.

Thaler, Paul S.

45.00 hrs 225.00 /hr

\$10,125.00

22.50 hrs 275.00 /hr

\$6,187.50

TOTAL FEES

74.40 hrs

\$18,080.00

TOTAL DISBURSEMENTS

\$406.45

TOTAL CHARGES FOR THIS BILL

\$18,486.45

NET BALANCE FORWARD

\$12,210.95

TOTAL BALANCE NOW DUE

\$30,697.40

*** Please use the following new payment remittance address:**

Cohen Seglias Pallas Greenhall & Furman PC
Attn: Accounts Receivable
30 South 17th Street, 19th Floor
Philadelphia, PA 19103

PAYMENT IS DUE IN FULL UPON RECEIPT.
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<http://www.cohenseglias.com/client-portal/>



30 SOUTH 17TH STREET, 19TH FLOOR
 PHILADELPHIA, PA 19103
 (215) 564-1700
 EIN:23-2639443

March 9, 2018

Billed through 02/28/2018

Bill Number 223723

Jacobson, Dr. Mark Z.
 946 Valdez Place
 Stanford, CA 94305

Client No. 54544
 Matter No. 00001
 Billing PST

Balance of last bill dated: 02/14/2018 \$30,697.40

Payments received since last bill 10,000.00

Net balance forward \$20,697.40

Pursuit of Retraction from PNAS (Proceedings of National Academy of Sciences) and Potential Collateral

FOR PROFESSIONAL SERVICES RENDERED

02/01/2018	PST	Prepare for hearing. Internal confs,	1.80 hrs	275 /hr	495.00
02/02/2018	PST	Attend hearing at DC Superior Court. Internal confs. T/c client.	3.80 hrs	275 /hr	1,045.00
02/03/2018	PST	Email to/from client.	0.30 hrs	275 /hr	82.50
02/05/2018	KSK	Review email from Dr. Jacobson; review recent tweets forwarded by Dr. Jacobson; draft email to Bernadette Somerville regarding preparation of briefing book for hearing on Special Motions to Dismiss	0.40 hrs	225 /hr	90.00
02/07/2018	PST	Email to/from client. Email to/from reporter.	0.40 hrs	275 /hr	110.00
02/07/2018	KSK	Review email from Dr. Jacobson	0.10 hrs	225 /hr	22.50
02/09/2018	PST	Interview with reporter. Rev. file.	1.00 hrs	275 /hr	275.00
02/09/2018	KSK	Review briefs and cases for briefing book	1.50 hrs	225 /hr	337.50
02/13/2018	PST	Prepare for hearing. T/c opposing counsel. Internal confs.	2.50 hrs	275 /hr	687.50
02/13/2018	KSK	Office conference with Paul Thaler; draft email to Carl Engel regarding legal research project; draft notes for Paul Thaler for oral argument	3.50 hrs	225 /hr	787.50
02/14/2018	PST	Prepare for hearing.	7.50 hrs	275 /hr	2,062.50
02/14/2018	KSK	Review briefs and prepare outline for oral argument; draft email to Carl Engel; draft Affidavit; draft email to Dr. Jacobson	6.10 hrs	225 /hr	1,372.50
02/14/2018	CLE	Legal research regarding recent anti-SLAPP decisions; Draft memorandum regarding same	3.00 hrs	225 /hr	675.00
02/15/2018	PST	Prepare for hearing	4.50 hrs	275 /hr	1,237.50
02/15/2018	KSK	Review research from Carl Engel; conduct additional legal research; email correspondence with Dr. Jacobson; draft outline for oral argument; additional legal	2.50 hrs	225 /hr	562.50

Bill Number 54544 00001 223723

		research			
02/15/2018	CLE	Finalize memorandum regarding recent anti-SLAPP decisions	1.10 hrs	225 /hr	247.50
02/16/2018	PST	Prepare for hearing.	5.20 hrs	275 /hr	1,430.00
02/16/2018	KSK	Brief office conference with Paul Thaler; draft notes for oral argument regarding elements of claims and what a jury could find; finish outline for oral argument	3.00 hrs	225 /hr	675.00
02/18/2018	PST	Prepare for hearing.	4.00 hrs	275 /hr	1,100.00
02/19/2018	PST	Prepare for hearing.	5.50 hrs	275 /hr	1,512.50
02/20/2018	PST	Hearing: motion to dismiss before Judge Wingo. To/from court. Internal confs. Confs with client. Confs with reporters.	6.30 hrs	275 /hr	1,732.50
02/21/2018	PST	T/c Dr. Jacobson. T/c opposing counsel. Legal research re dismissal. Prepare email to opposing counsel. Email to/from Dr. Jacobson. Internal confs.	3.20 hrs	275 /hr	880.00
02/21/2018	KSK	Legal research regarding voluntary dismissals and attorneys fees; office conference with Paul Thaler; draft voluntary dismissal	1.00 hrs	225 /hr	225.00
02/22/2018	PST	Confs with client. Internal conferences. Legal research re dismissal and legal fees. T/c with opposing counsel. Emails to/from client. File dismissal. Rev. statement from Dr. Jacobson.	2.80 hrs	275 /hr	770.00
02/22/2018	KSK	Brief office conference with Paul Thaler; revise Voluntary Dismissal; draft email to Dr. Jacobson; review Dr. Jacobson's "FAQs"	0.50 hrs	225 /hr	112.50
02/25/2018	KSK	Check Court's docket; draft email to Dr. Jacobson regarding status	0.10 hrs	225 /hr	22.50
02/26/2018	KSK	Brief office conference with Bernadette Somerville regarding status of filing; draft email to Dr. Jacobson regarding same	0.20 hrs	225 /hr	45.00
02/27/2018	KSK	Check court's docket; draft email to Bernadette Somerville; brief office conference with Bernadette Somerville; draft email to Mark Jacobson	0.30 hrs	225 /hr	67.50
<i>Fee Recapitulation</i>					
		Engel, Carl L	4.10 hrs	225.00 /hr	\$922.50
		Karas, Karen S.	19.20 hrs	225.00 /hr	\$4,320.00
		Thaler, Paul S.	48.80 hrs	275.00 /hr	\$13,420.00
		Total fees for this matter	72.10 hrs		<u>\$18,662.50</u>

DISBURSEMENTS

02/09/2018	KSK - e-filing of Praeipce for Jacobson case (replaced Ex. 3) - PST	16.38
02/16/2018	TRACKSTAND LLC; Invoice # 01082018; Costs for Service	9.00
02/28/2018	Copying or Printing	14.60
02/28/2018	Legal research Westlaw/Online	266.28
	Total disbursements for this matter	<u>\$306.26</u>

BILLING SUMMARY

Bill Number 54544 00001 223723

Engel, Carl L	4.10 hrs	225.00 /hr	\$922.50
Karas, Karen S.	19.20 hrs	225.00 /hr	\$4,320.00
Thaler, Paul S.	48.80 hrs	275.00 /hr	\$13,420.00

TOTAL FEES	72.10 hrs	\$18,662.50
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TOTAL DISBURSEMENTS	\$306.26
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TOTAL CHARGES FOR THIS BILL	\$18,968.76
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NET BALANCE FORWARD	\$20,697.40
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TOTAL BALANCE NOW DUE	\$39,666.16
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*** Please use the following new payment remittance address:**

Cohen Seglias Pallas Greenhall & Furman PC
Attn: Accounts Receivable
30 South 17th Street, 19th Floor
Philadelphia, PA 19103

PAYMENT IS DUE IN FULL UPON RECEIPT.

If you would like to pay by credit card, please input the Invoice No. and use this url:

<http://www.cohenseglias.com/client-portal/>



30 SOUTH 17TH STREET, 19TH FLOOR
 PHILADELPHIA, PA 19103
 (215) 564-1700
 EIN:23-2639443

April 6, 2018

Billed through 03/31/2018

Bill Number 224600

Jacobson, Dr. Mark Z.
 946 Valdez Place
 Stanford, CA 94305

Client No. 54544
 Matter No. 00001
 Billing PST

Balance of last bill dated: 03/09/2018 \$39,666.16

Payments received since last bill 10,000.00

Net balance forward \$29,666.16

Pursuit of Retraction from PNAS (Proceedings of National Academy of Sciences) and Potential Collateral

FOR PROFESSIONAL SERVICES RENDERED

03/06/2018	PST	Telephone call opposing counsel. Internal confs. Legal research.	1.00 hrs	275 /hr	275.00
03/07/2018	PST	Review motions for fees. Legal research. Confs with KK. Email to/from client. Telephone call client.	3.10 hrs	275 /hr	852.50
03/07/2018	KSK	Office conference with Paul Thaler regarding Defendants' motions for attorneys fees	0.20 hrs	225 /hr	45.00
03/08/2018	PST	Legal research re prevailing party in DC. Rev transcript of hearing. Email to/from client. Internal confs.	3.50 hrs	275 /hr	962.50
03/09/2018	PST	Legal research re "prevailing parties" and award of legal fees. Internal confs. Email to/from client.	3.70 hrs	275 /hr	1,017.50
03/10/2018	PST	Email to/from client. Rev. draft.	0.30 hrs	275 /hr	82.50
03/12/2018	PST	Email to/from client. Conf with KK. Legal research.	2.10 hrs	275 /hr	577.50
03/12/2018	KSK	Legal research on attorneys fees issue	1.50 hrs	225 /hr	337.50
03/13/2018	PST	Telephone call Dr. Jacobson. Legal research. Confs with KK. Revisions to opp. to motion for attorneys fees.	1.80 hrs	275 /hr	495.00
03/13/2018	KSK	Legal research; draft Opposition to NAS motion for attorney fees; review email correspondence from Mark Jacobson	7.00 hrs	225 /hr	1,575.00
03/14/2018	PST	Confs with KK. Legal research. Email to/from client.	0.50 hrs	275 /hr	137.50
03/14/2018	KSK	Review and respond to email from Dr. Jacobson; legal research	2.50 hrs	225 /hr	562.50
03/15/2018	PST	Numerous confs with KK. Legal research. Emails to/from client.	1.40 hrs	275 /hr	385.00

Bill Number 54544 00001 224600

03/15/2018	KSK	Legal research and draft opposition to Motion for fees	6.00 hrs	225 /hr	1,350.00
03/16/2018	KSK	Legal research and draft oppositions to motions for sanctions	8.00 hrs	225 /hr	1,800.00
03/17/2018	PST	Email to/from Dr. Jacobson. Review draft oppositions.	0.50 hrs	275 /hr	137.50
03/19/2018	PST	Review and revise draft opposition. Internal confs. Legal research.	2.50 hrs	275 /hr	687.50
03/19/2018	KSK	Review Dr. Jacobson's edits to oppositions to motions for fees; review Dr. Jacobson's email correspondence	0.30 hrs	225 /hr	67.50
03/20/2018	PST	Revisions to oppositions to motions for fees. Confs with KK. Emails to/from client.	1.60 hrs	275 /hr	440.00
03/20/2018	KSK	Legal research and draft oppositions to Motions for fees; draft proposed orders; email correspondence with Mark Jacobson	6.00 hrs	225 /hr	1,350.00
03/21/2018	PST	Final revisions to oppositions to motion for fees and file. Internal discussions. Email to/from client.	3.50 hrs	275 /hr	962.50
03/21/2018	KSK	Finalize Oppositions to Motions for fees; email correspondence with Paul Thaler; email correspondence with Bernadette Somerville; review and respond to email from Dr. Jacobson	1.50 hrs	225 /hr	337.50
03/30/2018	PST	Review reply briefs. Legal research. Confs with KK.	1.30 hrs	275 /hr	357.50
03/31/2018	PST	Email to/from client.	0.40 hrs	275 /hr	110.00
<i>Fee Recapitulation</i>					

Karas, Karen S.	33.00 hrs	225.00 /hr	\$7,425.00
Thaler, Paul S.	27.20 hrs	275.00 /hr	\$7,480.00
Total fees for this matter	60.20 hrs		<u>\$14,905.00</u>

DISBURSEMENTS

03/04/2018	CC - Jacobson Case Filing Fee (Praecipe for Voluntary Dismissal) - PST	16.38
03/04/2018	CC - Jacobson Case Filing Fee (Praecipe for Address Change) - PST	16.38
03/31/2018	Legal research Westlaw/Online	1,367.79
03/31/2018	Ribstone Scanning Bates or Printing	0.40

Total disbursements for this matter	<u>\$1,400.95</u>
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BILLING SUMMARY

Karas, Karen S.	33.00 hrs	225.00 /hr	\$7,425.00
Thaler, Paul S.	27.20 hrs	275.00 /hr	\$7,480.00

TOTAL FEES	60.20 hrs	<u>\$14,905.00</u>
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TOTAL DISBURSEMENTS	<u>\$1,400.95</u>
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TOTAL CHARGES FOR THIS BILL	<u>\$16,305.95</u>
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Bill Number 54544 00001 224600

NET BALANCE FORWARD

\$29,666.16

TOTAL BALANCE NOW DUE

\$45,972.11

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Attn: Accounts Receivable
30 South 17th Street, 19th Floor
Philadelphia, PA 19103

PAYMENT IS DUE IN FULL UPON RECEIPT.

If you would like to pay by credit card, please input the Invoice No. and use this url:

<http://www.cohenseglias.com/client-portal/>

03/09/2018	KSK	Telephone call opposing court's internal	1.00 hrs	275.00	275.00
		work - legal research			
03/09/2018	PST	Review motions for legal research	3.10 hrs	275.00	852.50
		Conf with RK. Email to/from client			
		Telephone call client			
03/12/2018	KSK	Office conference with Paul Thaler regarding	0.20 hrs	225.00	45.00
		Defendant's motions for attorney's fees			
03/08/2018	PST	Legal research to prevailing party in DC. Rev	2.80 hrs	275.00	772.50
		transfer of hearing. Email to/from client			
		internal work			
03/10/2018	PST	Email to/from client. Rev. doc.	0.30 hrs	275.00	87.50
03/12/2018	PST	Email to/from client. Conf with RK. Legal	2.10 hrs	275.00	577.50
		research			
03/12/2018	KSK	Legal research on attorney's fees issue	1.50 hrs	225.00	337.50
03/14/2018	PST	Telephone call Dr. Jacobson. Legal research	1.60 hrs	275.00	440.00
		Conf with RK. Revisions to opp. to motion for			
		attorney's fees			
03/13/2018	KSK	Legal research and deposition to NAS motion	7.00 hrs	225.00	1575.00
		for attorney fees. review email correspondence			
		from Mark Jacobson			
03/14/2018	PST	Conf with RK. legal research. Email to/from	2.90 hrs	275.00	797.50
		client			
03/14/2018	KSK	Review and research to opposing Dr.	2.50 hrs	225.00	562.50
		Dr. legal research			
03/15/2018	PST	Legal research	1.40 hrs	275.00	385.00
		Internal work			



30 SOUTH 17TH STREET, 19TH FLOOR
PHILADELPHIA, PA 19103
(215) 564-1700
EIN:23-2639443

May 4, 2018

Billed through 04/30/2018

Bill Number 225442

Jacobson, Dr. Mark Z.
946 Valdez Place
Stanford, CA 94305

Client No. 54544
Matter No. 00001
Billing PST

Balance of last bill dated: 04/06/2018 \$45,972.11

Payments received since last bill 10,000.00

Net balance forward \$35,972.11

Pursuit of Retraction from PNAS (Proceedings of National Academy of Sciences) and Potential Collateral

FOR PROFESSIONAL SERVICES RENDERED

04/02/2018	PST	Emails to/from client. Legal research. Internal confs.	1.50 hrs	275 /hr	412.50
04/03/2018	PST	Internal confs re surreply and motion for leave. Legal research. Email to/from client.	1.40 hrs	275 /hr	385.00
04/03/2018	KSK	Draft email to Ali Young regarding pertinent documents for sur-reply	0.50 hrs	225 /hr	112.50
04/03/2018	ADY	Review all briefs on attorney's fees in this matter; Review Court Rules and research motions for leave to file Sur-Reply; Draft Motion for Leave to file Sur-Reply for NAS; Draft Proposed Order; Begin researching "catalyst theory" and legislative history for Sur-Reply brief for NAS.	10.00 hrs	225 /hr	2,250.00
04/04/2018	PST	Internal discussions and legal research.	1.50 hrs	275 /hr	412.50
04/04/2018	ADY	Continue researching "catalyst theory" and legislative history and begin drafting Sur-Reply brief for NAS.	9.00 hrs	225 /hr	2,025.00
04/05/2018	PST	Revisions to sur-reply. Confs with AY. Legal research.	1.40 hrs	275 /hr	385.00
04/05/2018	KSK	Review and revise sur-reply	1.50 hrs	225 /hr	337.50
04/05/2018	ADY	Finish first draft of Sur-Reply brief for NAS; incorporate edits from Karen; send to client for review; work on second draft and cutting down page length.	6.50 hrs	225 /hr	1,462.50
04/06/2018	PST	Review and revise final revisions to sur-reply brief. Legal research. Internal discussions.	2.70 hrs	275 /hr	742.50
04/06/2018	KSK	Review and revise sur-reply; brief office conferences with Ali Young regarding same; review motion and sur-reply regarding Clack	1.00 hrs	225 /hr	225.00

Jacobson, Dr. Mark Z.

Page

2

Bill Number 54544 00001 225442

04/06/2018	ADY	Incorporate edits from client, Paul, and Karen and finalize Sur-Reply brief for NAS; Draft and finalize Motion for leave, proposed order, and Sur-Reply for Clack; file Motions/Sur-Replies for both NAS and Clack; email Judge word versions of proposed orders.	6.10 hrs	225 /hr	1,372.50
04/09/2018	PST	Confs with AY.	0.30 hrs	275 /hr	82.50
04/09/2018	ADY	Review docket for file stamped copy of motions for leave to file sur-reply and send to client.	0.70 hrs	225 /hr	157.50
04/11/2018	PST	Review oppositions to motion for leave. Internal confs.	0.40 hrs	275 /hr	110.00
04/12/2018	ADY	Read opposition to motion filed by NAS and Clack and send to client.	0.50 hrs	225 /hr	112.50

Fee Recapitulation

Young, Alissandra D	32.80 hrs	225.00 /hr	\$7,380.00
Karas, Karen S.	3.00 hrs	225.00 /hr	\$675.00
Thaler, Paul S.	9.20 hrs	275.00 /hr	\$2,530.00
Total fees for this matter	45.00 hrs		\$10,585.00

DISBURSEMENTS

04/15/2018	Filing Fee for Mark Jacobson Case - PST	16.38
04/15/2018	Filing Fee for Mark Jacobson Case - PST	16.38
04/30/2018	Legal research Westlaw/Online	282.10
Total disbursements for this matter		\$314.86

BILLING SUMMARY

Young, Alissandra D	32.80 hrs	225.00 /hr	\$7,380.00
Karas, Karen S.	3.00 hrs	225.00 /hr	\$675.00
Thaler, Paul S.	9.20 hrs	275.00 /hr	\$2,530.00

TOTAL FEES	45.00 hrs	\$10,585.00
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TOTAL DISBURSEMENTS	\$314.86
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TOTAL CHARGES FOR THIS BILL	\$10,899.86
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NET BALANCE FORWARD	\$35,972.11
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TOTAL BALANCE NOW DUE	\$46,871.97
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*** Please use the following new payment remittance address:**

**Cohen Seglias Pallas Greenhall & Furman PC
Attn: Accounts Receivable
30 South 17th Street, 19th Floor
Philadelphia, PA 19103**



30 SOUTH 17TH STREET, 19TH FLOOR
PHILADELPHIA, PA 19103
(215) 564-1700
EIN:23-2639443

June 6, 2018

Billed through 05/31/2018

Bill Number 226398

Jacobson, Dr. Mark Z.
946 Valdez Place
Stanford, CA 94305

Client No. 54544
Matter No. 00001
Billing PST

Balance of last bill dated: 05/04/2018

\$46,871.97

Payments received since last bill

10,000.00

Net balance forward

\$36,871.97

Pursuit of Retraction from PNAS (Proceedings of National Academy of Sciences) and Potential Collateral

FOR PROFESSIONAL SERVICES RENDERED

Fee Recapitulation

Total fees for this matter

0.00 hrs

\$0.00

DISBURSEMENTS

04/06/2018	ADY - Filing Fee for Mark Jacob Case - PST	36.88
04/06/2018	ADY - Filing Fee for Mark Jacob Case - PST	36.88
04/06/2018	ADY - Filing Fee for Mark Jacob Case - PST	36.88
04/06/2018	ADY - Filing Fee for Mark Jacob Case - PST	36.88

Total disbursements for this matter

\$147.52

BILLING SUMMARY

TOTAL DISBURSEMENTS
TOTAL CHARGES FOR THIS BILL
NET BALANCE FORWARD
TOTAL BALANCE NOW DUE

Paid 27,019.49 6/14/18 by cc
10,000 waived per
Paul Thaler
\$147.52
\$147.52
\$36,871.97
\$37,019.49

→ \$0 balance



30 SOUTH 17TH STREET, 19TH FLOOR
PHILADELPHIA, PA 19103
(215) 564-1700
EIN:23-2639443

July 12, 2018

Billed through 06/30/2018

Bill Number 227744

Jacobson, Dr. Mark Z.
946 Valdez Place
Stanford, CA 94305

Client No. 54544
Matter No. 00001
Billing PST

Balance of last bill dated: 06/06/2018	\$37,019.49
Payments received since last bill	27,019.49
Net balance forward	<u>\$0.00</u>

Pursuit of Retraction from PNAS (Proceedings of National Academy of Sciences) and Potential Collateral

FOR PROFESSIONAL SERVICES RENDERED

06/27/2018	PST	Rev. court order re surreply. Conf with KK	0.30 hrs	275 /hr	82.50
		<i>Fee Recapitulation</i>			
		Thaler, Paul S.	0.30 hrs	275.00 /hr	\$82.50
		Total fees for this matter	0.30 hrs		<u>\$82.50</u>

DISBURSEMENTS

06/30/2018	Ribstone Scanning Bates or Printing	0.30
Total disbursements for this matter		<u>\$0.30</u>

BILLING SUMMARY

Thaler, Paul S.	0.30 hrs	275.00 /hr	\$82.50
TOTAL FEES	0.30 hrs		<u>\$82.50</u>
TOTAL DISBURSEMENTS			<u>\$0.30</u>
TOTAL CHARGES FOR THIS BILL			<u>\$82.80</u>
NET BALANCE FORWARD			<u>\$0.00</u>
TOTAL BALANCE NOW DUE			<u><u>\$82.80</u></u>

COHEN, SEGLIAS, PALLAS, GREENHALL & FURMAN, P.C.

30 SOUTH 17TH STREET, 19TH FLOOR
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(215) 564-1700
EIN:23-2639443

BILLING STATEMENT

August 03, 2018

Client: 54544

Jacobson, Dr. Mark Z.
946 Valdez Place
Stanford, CA 94305

Our records indicate the following invoices are past due:

Matter Number: 00001 **Pursuit of Retraction from PNA**

<u>Invoice #</u>	<u>Invoice Date</u>	<u>Invoice Amount</u>	<u>Balance Due</u>
227744	07/12/18	\$82.80	\$82.80
Total			\$82.80
Total balance due, please pay this amount			\$82.80

paid 8/6/18

PAYMENT IS DUE IN FULL UPON RECEIPT.
If you would like to pay by credit card, please input the
Invoice No. and use this url:
<http://www.cohenseglias.com/client-portal/>

If you have any questions, please contact Steve Leighton at 267-238-4729 or by email at Sleighton@cohenseglias.com.



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PHILADELPHIA, PA 19103
(215) 564-1700
EIN:23-2639443

February 10, 2020

Billed through 01/31/2020

Bill Number 246730

Jacobson, Dr. Mark Z.
946 Valdez Place
Stanford, CA 94305

Client No. 54544
Matter No. 00001
Billing PST

Balance of last bill dated: 02/07/2019 \$82.50

Payments received since last bill 0.00

Net balance forward \$0.00

Pursuit of Retraction from PNAS (Proceedings of National Academy of Sciences) and Potential Collateral

FOR PROFESSIONAL SERVICES RENDERED

01/21/2020	PST	Email to/from client. Research file.	0.30 hrs	275 /hr	82.50
		<i>Fee Recapitulation</i>			
		Thaler, Paul S.	0.30 hrs	275.00 /hr	\$82.50
		Total fees for this matter	0.30 hrs		\$82.50

BILLING SUMMARY

Thaler, Paul S.	0.30 hrs	275.00 /hr	\$82.50
TOTAL FEES	0.30 hrs		\$82.50
TOTAL CHARGES FOR THIS BILL			\$82.50
NET BALANCE FORWARD			\$0.00
TOTAL BALANCE NOW DUE			\$82.50

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Philadelphia, PA 19103



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 PHILADELPHIA, PA 19103
 (215) 564-1700
 EIN:23-2639443

May 15, 2020

Billed through 04/30/2020

Bill Number 250442

Jacobson, Dr. Mark Z.
 946 Valdez Place
 Stanford, CA 94305

Client No. 54544
 Matter No. 00001
 Billing PST

Balance of last bill dated: 02/10/2020	\$82.50
Payments received since last bill	0.00
Net balance forward	\$82.50

Pursuit of Retraction from PNAS (Proceedings of National Academy of Sciences) and Potential Collateral

FOR PROFESSIONAL SERVICES RENDERED

04/20/2020	PST	Review court's order and opinion. Email client.	1.20 hrs	275 /hr	330.00
04/21/2020	PST	Telephone call Dr. Jacobson. Conf with JN. Legal research.	2.00 hrs	275 /hr	550.00
04/21/2020	JSN	Telephone call with P. Thaler re: case background, recent court order, and case strategy.	0.30 hrs	225 /hr	67.50
04/22/2020	PST	Email to/from client. Conf with JN.	0.40 hrs	275 /hr	110.00
04/23/2020	PST	Telephone call client. Conf with JN.	0.70 hrs	275 /hr	192.50
04/23/2020	JSN	Telephone call and emails with P. Thaler and client re: decision; review and analyze client submission and case file; review and analyze Judge Wingo's opinion.	2.60 hrs	225 /hr	585.00
04/24/2020	PST	Conf with JN. Review and revise letter. Email to/from client.	0.60 hrs	275 /hr	165.00
04/24/2020	JSN	Review and analyze court opinion; review and analyze Mann case cited by client; draft and revise letter to PNAS; T/C with P. Thaler re: same.	3.00 hrs	225 /hr	675.00
04/25/2020	PST	Confs with JN. Finalize letter.	0.40 hrs	275 /hr	110.00
04/25/2020	JSN	Draft and revise letters per client comments; emails with P. Thaler re: same; finalize and transmit letters to counsel for Clack and NAS.	0.90 hrs	225 /hr	202.50
04/28/2020	PST	Confs with JN re deadlines and strategy.	0.40 hrs	275 /hr	110.00
04/28/2020	JSN	Conduct research on timing and underlying basis for motion for reconsideration; emails with P. Thaler re: same; draft and revise memo summarizing research.	1.80 hrs	225 /hr	405.00
04/29/2020	PST	Email to/from opposing counsel. Internal confs. Email to/from client.	0.60 hrs	275 /hr	165.00

Bill Number 54544 00001 250442

04/29/2020	JSN	Emails with P. Thaler and opposing counsel re: settlement talks; Telephone call with P. Thaler re: same and case strategy.	0.30 hrs	225 /hr	67.50
04/30/2020	PST	Telephone call JN. Email to/from client. Legal research.	1.00 hrs	275 /hr	275.00
04/30/2020	JSN	Confer with P. Thaler re: case strategy and motion for reconsideration.	0.10 hrs	225 /hr	22.50
<i>Fee Recapitulation</i>					
		Nichols, Jackson S.	9.00 hrs	225.00 /hr	\$2,025.00
		Thaler, Paul S.	7.30 hrs	275.00 /hr	\$2,007.50
		Total fees for this matter	16.30 hrs		<u>\$4,032.50</u>

BILLING SUMMARY

Nichols, Jackson S.	9.00 hrs	225.00 /hr	\$2,025.00
Thaler, Paul S.	7.30 hrs	275.00 /hr	\$2,007.50
 TOTAL FEES	 16.30 hrs		 <u>\$4,032.50</u>
TOTAL CHARGES FOR THIS BILL			<u>\$4,032.50</u>
NET BALANCE FORWARD			\$82.50
TOTAL BALANCE NOW DUE			<u><u>\$4,115.00</u></u>

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30 South 17th Street, 19th Floor
Philadelphia, PA 19103**

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If you would like to pay by credit card, please input
the Invoice No. and use this url:
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30 SOUTH 17TH STREET, 19TH FLOOR
 PHILADELPHIA, PA 19103
 (215) 564-1700
 EIN:23-2639443

June 8, 2020

Billed through 05/31/2020

Bill Number 251185

Jacobson, Dr. Mark Z.
 946 Valdez Place
 Stanford, CA 94305

Client No. 54544
 Matter No. 00001
 Billing PST

Balance of last bill dated: 05/15/2020 \$4,115.00

Payments received since last bill 0.00

Net balance forward \$4,115.00

Pursuit of Retraction from PNAS (Proceedings of National Academy of Sciences) and Potential Collateral

FOR PROFESSIONAL SERVICES RENDERED

05/01/2020	PST	Email to/from opposing counsel. Internal confs.	0.40 hrs	275 /hr	110.00
05/04/2020	PST	Email to/from opposing counsel. Email to/from client. Conf with JN.	0.80 hrs	275 /hr	220.00
05/04/2020	JSN	Review and analyze Defendants' requests for attorneys' fees; email with P. Thaler re: same.	0.20 hrs	225 /hr	45.00
05/05/2020	PST	Conf with JN.	0.40 hrs	275 /hr	110.00
05/05/2020	JSN	Review and analyze Defendants' requests for attorneys' fees; Telephone call and emails with P. Thaler re: same.	0.30 hrs	225 /hr	67.50
05/06/2020	JSN	Emails with client re: edits to motion for reconsideration.	0.10 hrs	225 /hr	22.50
05/07/2020	PST	Email to/from client. Confs with JN.	0.40 hrs	275 /hr	110.00
05/07/2020	JSN	Emails with client and P. Thaler re: revisions to brief.	0.30 hrs	225 /hr	67.50
05/08/2020	PST	Email to/from client. Internal confs.	0.40 hrs	275 /hr	110.00
05/08/2020	JSN	Draft and revise motion for reconsideration; emails with client re: same.	1.90 hrs	225 /hr	427.50
05/11/2020	JSN	Draft and revise motion for reconsideration; review and analyze client comments on same.	2.80 hrs	225 /hr	630.00
05/12/2020	JSN	Draft and revise motion for reconsideration; review and analyze client comments on same; conduct research on defamation based on suggested cases provided from client.	1.00 hrs	225 /hr	225.00
05/13/2020	SMW	Review of Hunton's and Denton's fee application support; Conference with J. Nichols re: same	0.60 hrs	275 /hr	165.00
05/13/2020	PST	Internal confs. Rev. invoices.	1.00 hrs	275 /hr	275.00
05/13/2020	JSN	Review and analyze fee petition; Telephone	10.60 hrs	225 /hr	2,385.00

Bill Number 54544 00001 251185

		call with P. Thaler re: same; draft and revise motion for reconsideration; review and analyze Court Order and previous briefing for same.			
05/14/2020	SMW	Review of Dentons and Hunton billing statements to identify excessive or unreasonable billings; Summarize findings	2.00 hrs	275 /hr	550.00
05/14/2020	PST	Internal confs. Email to/from client. Rev. motion.	1.20 hrs	275 /hr	330.00
05/14/2020	JSN	Review and analyze fee petition; Telephone call with P. Thaler re: same; draft and revise motion for reconsideration; review and analyze Court Order and previous briefing for same; emails with client re: same.	4.50 hrs	225 /hr	1,012.50
05/15/2020	SMW	Review of and analyze Hunton bills for fee application; Email to J. Nichols re: same	3.00 hrs	275 /hr	825.00
05/15/2020	PST	Internal confs. Review drafts. Email.	1.90 hrs	275 /hr	522.50
05/15/2020	JSN	Review and analyze fee petition; draft and revise motion for reconsideration; conduct research for same; emails with P. Thaler re: same; review and analyze Court Order and previous briefing for same; emails with client re: same.	8.50 hrs	225 /hr	1,912.50
05/15/2020	PFW	Research whether attorney's fees incurred during the preparation of a fee petition may be sought in a fee petition.	1.50 hrs	225 /hr	337.50
05/16/2020	PST	Internal confs re fee requests. Email.	0.60 hrs	275 /hr	165.00
05/16/2020	JSN	Draft and revise letters responding to Clack and NAS invoices in support of fee petitions; emails with client re: same; conduct research for DC law re: same.	3.50 hrs	225 /hr	787.50
05/16/2020	PFW	Research case law to locate cases providing examples of judges exclusions of certain portions of attorney fee petitions.	1.50 hrs	225 /hr	337.50
05/17/2020	PST	Email to/from client. Internal confs.	0.60 hrs	275 /hr	165.00
05/17/2020	JSN	Draft and revise motion for reconsideration; emails with client re: same; Telephone call with P. Thaler re: same.	4.80 hrs	225 /hr	1,080.00
05/18/2020	PST	Review and revise motion for reconsideration. Confs with JN. Email to/from client.	2.00 hrs	275 /hr	550.00
05/18/2020	JSN	Draft and revise motion for reconsideration; emails with client re: same; Telephone call and emails with P. Thaler re: same; finalize and file same; draft and revise letters to NAS and Clack counsel re: objections to fees.	6.40 hrs	225 /hr	1,440.00
05/19/2020	PST	Email to/from client. Confs with JN.	1.00 hrs	275 /hr	275.00
05/19/2020	JSN	Emails with client and P. Thaler re: revisions to letters; Telephone call with P. Thaler re: same.	1.30 hrs	225 /hr	292.50

Fee Recapitulation

Nichols, Jackson S.	46.20 hrs	225.00 /hr	\$10,395.00
Williamson, Paul F	3.00 hrs	225.00 /hr	\$675.00
Thaler, Paul S.	10.70 hrs	275.00 /hr	\$2,942.50
Williams, Steven M.	5.60 hrs	275.00 /hr	\$1,540.00
Total fees for this matter	65.50 hrs		\$15,552.50

DISBURSEMENTS

Jacobson, Dr. Mark Z.

Page 3

Bill Number 54544 00001 251185

05/31/2020 Legal research Westlaw/Online 358.37

Total disbursements for this matter \$358.37

BILLING SUMMARY

Nichols, Jackson S.	46.20 hrs	225.00 /hr	\$10,395.00
Williamson, Paul F	3.00 hrs	225.00 /hr	\$675.00
Thaler, Paul S.	10.70 hrs	275.00 /hr	\$2,942.50
Williams, Steven M.	5.60 hrs	275.00 /hr	\$1,540.00

TOTAL FEES 65.50 hrs \$15,552.50

TOTAL DISBURSEMENTS \$358.37

INTEREST BILLED \$0.83

TOTAL CHARGES FOR THIS BILL \$15,911.70

NET BALANCE FORWARD \$4,115.00

TOTAL BALANCE NOW DUE \$20,026.70

**** Please use the following new payment remittance address:***

***Cohen Seglias Pallas Greenhall & Furman PC
Attn: Accounts Receivable
30 South 17th Street, 19th Floor
Philadelphia, PA 19103***

**PAYMENT IS DUE IN FULL UPON RECEIPT.
If you would like to pay by credit card, please input
the Invoice No. and use this url:
<http://www.cohenseglias.com/client-portal/>**



30 SOUTH 17TH STREET, 19TH FLOOR
PHILADELPHIA, PA 19103
(215) 564-1700
EIN:23-2639443

July 13, 2020

Billed through 06/30/2020

Bill Number 252468

Jacobson, Dr. Mark Z.
946 Valdez Place
Stanford, CA 94305

Client No. 54544
Matter No. 00001
Billing PST

Balance of last bill dated: 06/08/2020 \$20,026.70

Payments received since last bill 0.00

Net balance forward \$20,026.70

Pursuit of Retraction from PNAS (Proceedings of National Academy of Sciences) and Potential Collateral

FOR PROFESSIONAL SERVICES RENDERED

06/01/2020	JSN	Emails with P. Thaler re: NAS and Clack filings (0.2); conduct initial review and analysis of same (0.8); emails with client re: same and deadlines for response (0.2).	1.20 hrs	225 /hr	270.00
06/02/2020	JSN	Review and analyze re-filed version of NAS praecipe (0.2).	0.20 hrs	225 /hr	45.00
06/03/2020	JSN	Review and analyze client email and declaration (0.2); email with P. Thaler re: same (0.1).	0.30 hrs	225 /hr	67.50
06/05/2020	JSN	Review and analyze declarations, legal summary, and revisions thereto (1.5); review and analyze Clack and NAS oppositions and supporting documents (2.2); emails with client re: same (0.1); emails with P. Thaler re: same (0.3); draft and revise outline of reply brief (1.0).	5.10 hrs	225 /hr	1,147.50
06/06/2020	JSN	Review and analyze declarations, legal summary, and revisions thereto (0.3); review and analyze Clack and NAS oppositions and supporting documents (0.4); emails with client re: same (0.1); emails with P. Thaler re: same (0.2); draft and revise reply brief (6.1); conduct legal research for same (0.4).	7.50 hrs	225 /hr	1,687.50
06/07/2020	JSN	Emails with client re: edits to declaration and reply brief.	0.30 hrs	225 /hr	67.50
06/08/2020	PST	Conf with JN re reply brief.	0.40 hrs	275 /hr	110.00
06/08/2020	PST	Review reply brief.	0.40 hrs	275 /hr	110.00
06/08/2020	JSN	Draft and revise reply brief (3.5); draft and revise affidavit (0.4); emails with client re: same (0.3); finalize and file brief (0.6).	4.00 hrs	225 /hr	900.00

Bill Number	54544	00001	252468			
06/10/2020	JSN	Review and analyze fee NAS and Clack petitions (0.5); draft and revise response to same (1.2).	1.70 hrs	225 /hr	382.50	
06/12/2020	JSN	Draft and revise response to NAS and Clack fee requests (2.9); review and analyze client comments for same (0.6); review and analyze Clack and NAS submission (0.4); emails with client re: same (0.3).	4.20 hrs	225 /hr	945.00	
06/13/2020	JSN	Draft and revise NAS fee petition (4.4); conduct research for same (1.1); email with client re: same (0.2).	4.50 hrs	225 /hr	1,012.50	
06/14/2020	JSN	Draft and revise Clack fee petition (4.2); conduct research for same (0.6); email with client re: same (0.2).	5.00 hrs	225 /hr	1,125.00	
06/15/2020	PST	Confs with JN re briefs.	0.50 hrs	275 /hr	137.50	
06/15/2020	PST	Review briefs.	0.50 hrs	275 /hr	137.50	
06/15/2020	JSN	Telephone call with P. Thaler re: briefing (0.4); review and analyze client comments to briefing (0.3); draft and revise Clack and NAS response briefs (5.5); finalize and file same (0.3).	5.00 hrs	225 /hr	1,125.00	
06/16/2020	JSN	Emails with P. Thaler re: case status and strategy.	0.20 hrs	225 /hr	45.00	
06/17/2020	JSN	Review and analyze e-filed version of fee petition responses to confirm receipt in court e-filing system (0.2); email client copies of same (0.1).	0.30 hrs	225 /hr	67.50	
06/22/2020	PST	Confs with JN.	0.30 hrs	275 /hr	82.50	
06/22/2020	JSN	Review and analyze reply briefs (0.4); Telephone call with P. Thaler re: same and case status (0.2); email with client re: same (0.1).	0.70 hrs	225 /hr	157.50	
06/25/2020	PST	Review order. Telephone call JN.	0.40 hrs	275 /hr	110.00	
06/25/2020	JSN	Review and analyze order (0.3); Telephone call with P. Thaler re: same and case strategy (0.2); email with client re: same (0.1); review and analyze rule governing appeal rules (0.1).	0.70 hrs	225 /hr	157.50	
<i>Fee Recapitulation</i>						
		Nichols, Jackson S.	40.90 hrs	225.00 /hr	\$9,202.50	
		Thaler, Paul S.	2.50 hrs	275.00 /hr	\$687.50	
		Total fees for this matter	43.40 hrs		\$9,890.00	

DISBURSEMENTS

05/20/2020	Cc Dc Court Efile- Nic - Thaler	16.38
05/20/2020	Cc Dc Court Efile- Nic - Thaler	36.88
06/30/2020	Legal research Westlaw/Online	276.20
	Total disbursements for this matter	\$329.46

BILLING SUMMARY

Nichols, Jackson S.	40.90 hrs	225.00 /hr	\$9,202.50
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Jacobson, Dr. Mark Z.

Page 3

Bill Number 54544 00001 252468

Thaler, Paul S. 2.50 hrs 275.00 /hr \$687.50

TOTAL FEES 43.40 hrs \$9,890.00

TOTAL DISBURSEMENTS \$329.46

TOTAL CHARGES FOR THIS BILL \$10,219.46

NET BALANCE FORWARD \$20,026.70

TOTAL BALANCE NOW DUE \$30,246.16

** Please use the following new payment remittance address:*

Cohen Seglias Pallas Greenhall & Furman PC
Attn: Accounts Receivable
30 South 17th Street, 19th Floor
Philadelphia, PA 19103

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30 SOUTH 17TH STREET, 19TH FLOOR
PHILADELPHIA, PA 19103
(215) 564-1700
EIN:23-2639443

August 11, 2020

Billed through 07/31/2020

Bill Number 253467

Jacobson, Dr. Mark Z.
946 Valdez Place
Stanford, CA 94305

Client No. 54544
Matter No. 00001
Billing PST

Balance of last bill dated: 07/13/2020 \$30,246.16

Payments received since last bill 0.00

Net balance forward \$30,246.16

Pursuit of Retraction from PNAS (Proceedings of National Academy of Sciences) and Potential Collateral

FOR PROFESSIONAL SERVICES RENDERED

07/08/2020	JSN	Emails with P. Thaler re: press response and research task for appeal.	0.10 hrs	225 /hr	22.50
07/10/2020	JSN	Telephone call and emails with J. Pacicco re: research on time for filing an appeal.	0.40 hrs	225 /hr	90.00
07/10/2020	JLP	Phone Conference with Jackson regarding research assignment.	0.20 hrs	195 /hr	39.00
07/10/2020	JLP	Research on timing to file notice of appeal.	1.00 hrs	195 /hr	195.00
07/14/2020	JSN	Telephone call with P. Thaler re: appeal research; email with client re: same.	0.20 hrs	225 /hr	45.00
<i>Fee Recapitulation</i>					
		Pacicco, Jennifer L	1.20 hrs	195.00 /hr	\$234.00
		Nichols, Jackson S.	0.70 hrs	225.00 /hr	\$157.50
		Total fees for this matter	1.90 hrs		<u>\$391.50</u>

DISBURSEMENTS

07/31/2020	Legal research Westlaw/Online	61.78
	Total disbursements for this matter	<u>\$61.78</u>

BILLING SUMMARY

Pacicco, Jennifer L	1.20 hrs	195.00 /hr	\$234.00
Nichols, Jackson S.	0.70 hrs	225.00 /hr	\$157.50

Bill Number 54544 00001 253467

TOTAL FEES	1.90 hrs	\$391.50
TOTAL DISBURSEMENTS		\$61.78
INTEREST BILLED		\$0.83
TOTAL CHARGES FOR THIS BILL		\$454.11
NET BALANCE FORWARD		\$30,246.16
TOTAL BALANCE NOW DUE		\$30,700.27

** Please use the following new payment remittance address:*

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PHILADELPHIA, PA 19103
(215) 564-1700
EIN:23-2639443

September 2, 2020

Billed through 08/31/2020

Bill Number 254274

Jacobson, Dr. Mark Z.
946 Valdez Place
Stanford, CA 94305

Client No. 54544
Matter No. 00001
Billing PST

Balance of last bill dated: 08/11/2020	\$30,700.27
Payments received since last bill	15,000.00
Net balance forward	<u>\$15,700.27</u>

Pursuit of Retraction from PNAS (Proceedings of National Academy of Sciences) and Potential Collateral

FOR PROFESSIONAL SERVICES RENDERED

Fee Recapitulation

Total fees for this matter	0.00 hrs	<u>\$0.00</u>
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DISBURSEMENTS

06/10/2020	JSN - filing fee of Reply Brief re Jacobson matter	16.38
06/17/2020	JSN - filing fee re Jacobson Response to Clack Fee Petition	16.38
06/17/2020	JSN - filing fee Jacobson Response to NAS Fee Petition	16.38
	Total disbursements for this matter	<u>\$49.14</u>

BILLING SUMMARY

TOTAL DISBURSEMENTS	<u>\$49.14</u>
TOTAL CHARGES FOR THIS BILL	<u>\$49.14</u>
NET BALANCE FORWARD	<u>\$15,700.27</u>
TOTAL BALANCE NOW DUE	<u><u>\$15,749.41</u></u>

** Please use the following new payment remittance*



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PHILADELPHIA, PA 19103
(215) 564-1700
EIN:23-2639443

October 15, 2020

Billed through 09/30/2020

Bill Number 255958

Jacobson, Dr. Mark Z.
946 Valdez Place
Stanford, CA 94305

Client No. 54544
Matter No. 00001
Billing PST

Balance of last bill dated: 09/02/2020 \$15,749.41

Payments received since last bill 0.00

Net balance forward \$15,749.41

Pursuit of Retraction from PNAS (Proceedings of National Academy of Sciences) and Potential Collateral

FOR PROFESSIONAL SERVICES RENDERED

Fee Recapitulation

Total fees for this matter 0.00 hrs \$0.00

BILLING SUMMARY

INTEREST BILLED	\$50.26
TOTAL CHARGES FOR THIS BILL	\$50.26
NET BALANCE FORWARD	\$15,749.41
TOTAL BALANCE NOW DUE	\$15,799.67

*** Please use the following new payment remittance address:**

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30 South 17th Street, 19th Floor
Philadelphia, PA 19103**



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PHILADELPHIA, PA 19103
(215) 564-1700
EIN:23-2639443

November 4, 2020

Billed through 10/31/2020

Bill Number 256726

Jacobson, Dr. Mark Z.
946 Valdez Place
Stanford, CA 94305

Client No. 54544
Matter No. 00001
Billing PST

Balance of last bill dated: 10/15/2020 \$15,799.67

Payments received since last bill 0.00

Net balance forward \$15,799.67

Pursuit of Retraction from PNAS (Proceedings of National Academy of Sciences) and Potential Collateral

FOR PROFESSIONAL SERVICES RENDERED

Fee Recapitulation

Total fees for this matter 0.00 hrs \$0.00

BILLING SUMMARY

INTEREST BILLED	\$152.45
TOTAL CHARGES FOR THIS BILL	\$152.45
NET BALANCE FORWARD	\$15,799.67
TOTAL BALANCE NOW DUE	<u>\$15,952.12</u>

*** Please use the following new payment remittance address:**

**Cohen Seglias Pallas Greenhall & Furman PC
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30 South 17th Street, 19th Floor
Philadelphia, PA 19103**



30 SOUTH 17TH STREET, 19TH FLOOR
PHILADELPHIA, PA 19103
(215) 564-1700
EIN:23-2639443

December 4, 2020

Billed through 11/30/2020

Bill Number 257904

Jacobson, Dr. Mark Z.
946 Valdez Place
Stanford, CA 94305

Client No. 54544
Matter No. 00001
Billing PST

Balance of last bill dated: 11/04/2020 \$15,952.12

Payments received since last bill 0.00

Net balance forward \$15,952.12

Pursuit of Retraction from PNAS (Proceedings of National Academy of Sciences) and Potential Collateral

FOR PROFESSIONAL SERVICES RENDERED

Fee Recapitulation

Total fees for this matter 0.00 hrs \$0.00

BILLING SUMMARY

INTEREST BILLED	\$157.48
TOTAL CHARGES FOR THIS BILL	\$157.48
NET BALANCE FORWARD	\$15,952.12
TOTAL BALANCE NOW DUE	<u>\$16,109.60</u>

*** Please use the following new payment remittance address:**

**Cohen Seglias Pallas Greenhall & Furman PC
Attn: Accounts Receivable
30 South 17th Street, 19th Floor
Philadelphia, PA 19103**



1600 MARKET STREET, 32ND FLOOR
PHILADELPHIA, PA 19103
(215) 564-1700
EIN:23-2639443

January 12, 2021

Billed through 12/31/2020

Bill Number 259168

Jacobson, Dr. Mark Z.
946 Valdez Place
Stanford, CA 94305

Client No. 54544
Matter No. 00001
Billing PST

Balance of last bill dated: 12/04/2020 \$16,109.60

Payments received since last bill 10,000.00

Net balance forward \$6,109.60

Pursuit of Retraction from PNAS (Proceedings of National Academy of Sciences) and Potential Collateral

FOR PROFESSIONAL SERVICES RENDERED

Fee Recapitulation

Total fees for this matter 0.00 hrs \$0.00

BILLING SUMMARY

INTEREST BILLED \$57.49

TOTAL CHARGES FOR THIS BILL \$57.49

NET BALANCE FORWARD \$6,109.60

TOTAL BALANCE NOW DUE \$6,167.09

*** Please use the following new payment remittance address:**

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1600 Market St. - 32nd Floor
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