

January 31, 2008

**To: Purdue University Committee**

**RE: Dr. Rusi Taleyarkhan**

Dear Committee Members:

I am aware that there is an investigation of Dr. Taleyarkhan and I write to provide information to the Committee that will help to get to the truth of this matter. The information contained in this letter, while I have had help drafting it, is true to the best of my knowledge.

I am a post-doctoral student at Purdue University in the School of Nuclear Engineering. I was awarded my Ph.D. in May, 2004. My CV is attached. I am a co-author of the Yiban Xu, Adam Butt journal paper entitled "Confirmatory Experiments for Nuclear Emissions During Acoustic Cavitation", *235 Nuclear Engineering And Design* 1317-1324 (2005) (the "NED paper"). I am also a co-author of the Yiban Xu, Adam Butt, Shripad T. Revankar paper entitled "Bubble Dynamics and Tritium Emission During Bubble Fusion Experiments" (2005) prepared for the 11th International Topical Meeting on Nuclear Reactor Thermal-Hydraulics in Avignon, France, October 2-6, 2005 (NURETH-11) (the "NURETH-11 paper").

Around November 2003 I was recruited by Professor Lefteri Tsoukalas ("Tsoukalas") to conduct bubble fusion experiments. I initially assisted Tsoukalas' group on a part-time basis up until I defended my Ph.D. thesis in February 2004 and then I became full-time under the direction of Taleyarkhan. The Tsoukalas group consisted of: Lefteri Tsoukalas, Tatjana Jevremovic, Martin Bertodano, Shripad Revankar, Josh Walter, Anton Bougaev, Frank Clikeman, and myself.

I conducted my experiments (reported in NED and in NURETH-11) in Tsoukalas' laboratory over about 5 months (from January, 2004 through May, 2004). Prof. Taleyarkhan's laboratory did not exist at the time. His laboratory was eventually set up in an off-campus space for work that was initiated in late May, 2004. I conducted additional experiments for the NED paper in July 2004 and for the NURETH-11 paper from February 2005 through the summer of 2005.

During the time I conducted my experiments in January 2004 to May 2004, I attended Tsoukalas' scheduled (usually) weekly group meetings where I would report on my work or give input as necessary. I conducted independent tritium measurements for samples from experiments conducted by other members of Tsoukalas' team. My tritium measurements were taken on a sensitive Beckman Spectrometer from ORNL. Professor Revankar would often cross check some of my work. Other members of Tsoukalas' team used a different, Packard Spectrometer for measurements.

At one point, I was co-author for a NURETH-11 paper with Tsoukalas, Revankar and others which was meant to report on data Tsoukalas' team had collected through our cumulative efforts. I noted that in September 2004, Tsoukalas or someone in his group submitted a draft of a paper to NURETH-11 that left out the Beckman Spectrometer readings and data that I had primarily been working on. When I learned of this, around October of 2004, I

asked that my name be taken off the Tsoukalas, et al. paper. In December 2004, I began to write my own paper for NURETH-11 to show my own experimental results. As the NURETH-11 was a thermal-hydraulics paper, I decided that additional data and information would be needed for sonoluminescence and shockwave analysis.

I tutored a student, Adam Butt, from June 2004 onwards about fabrication and operation of sonofusion test cells and performance checkout studies. Such work was part of Butt's MS thesis requirements.

I made the decision to include Butt as a co-author of the NED and NURETH -11 papers. On November 30, 2004, a referee from Physics Review Letters ("PRL") made a comment (why there was only one author, with not cross checking of data) that prompted me to consider Butt as a co-author. Butt, who was already experimenting with me on sonofusion test cells was best suited to properly conduct due diligence checks and help me independently confirm data, data transfers for post-processing, analysis of data, and conclusions. I asked Taleyarkhan, Butt's thesis advisor at the time, for permission to approach Butt, his student, for this function. Taleyarkhan agreed using Butt for this purpose was a good idea. I approached Butt and asked him to help after receiving approval from Taleyarkhan. Our PRL paper was eventually rejected around January 28, 2005.

Butt was grateful for the opportunity, happy and willing to accept. He conducted checks of data, validated and confirmed appropriate transfer and use for post-processing, data analyses and conclusions. Butt transmitted his findings to me and to Taleyarkhan via email.

Butt also performed a review of the draft manuscript for NED and offered his corrections and suggestions.

Butt willingly and enthusiastically signed the NED journal joint transmittal letter accepting co-authorship and never showed signs of discontent to me.

Butt willingly posed for pictures with me for a July 12, 2005 Purdue University Press Release. He participated in discussions with E. Venere and provided comments for the Press Release.

I added Butt during early 2005 to be co-author of the NURETH-11 conference paper because of the overlap of the NED and NURETH-11 papers. Butt was excited to be the person chosen to possibly go to present since I could not go (for Visa reasons). Per my recollection, Butt participated in data acquisition for sonoluminescent signals from various shaped bubble clusters which were included in the NURETH-11 paper. Butt's name was on the paper since January, 2005 and the conference was held during October, 2005. Neither I, nor to my knowledge, Revankar nor Taleyarkhan, pressured Butt in any way, shape or form. In fact, he was thrilled and gratified that he was part of the team. In fact, on August 12, 2005, Butt invited me to his wedding with the following email written to several individuals:

Dr. Taleyarkhan, Dr. Hrbud, Dr. Heister, Dr. Choi, Dr. Anderson, Dr. Xu,

"My fiancee Marianne and I would like to invite you all and your families to our wedding on the 27th of August. I am sorry for the very short notice, your formal invitations are in the mail and should be arriving very soon. You may either send back the return card that will be enclosed or email/talk to me directly.

You have all been a tremendous inspiration and guidance to me over my years here and

we would be honored if you are able to make it. Thanks and take care,

-=Adam=-"

Taleyarkhan never exerted any pressure on me or, as far as I know, Butt to participate in the experiments. Taleyarkhan stayed away from my experiments as much as possible. Taleyarkhan told me he wanted to remain distant from the actual experimentation, data gathering, etc. and did not want to influence outcomes. His actions confirmed this.

The value of having someone else intimately involved via cross-checking the acquired data, ensuring absence of errors in data acquisition, transfer, etc., which was pointed out by an external referee on November 30, 2004, applied to the NURETH-11 paper as well. Revankar did significant work on tritium assessment for that paper and was included as an author for that reason.

Taleyarkhan did not participate in the reported work of the NED / NURETH-11 papers. The reported work involved an experimentation system different from that used at ORNL, a new method for attaining thermal-hydraulics for the test cell, a new method for nucleation of bubbles with neutrons, a different set of protocols and calibrations for detectors for tritium, different neutron detectors, independent data checks, independent data analyses and conclusions. Taleyarkhan's role, along with other people acknowledged in the papers, was to provide a test cell and how to operate it, and to give me advice as I asked for it. The test cell and its operation are not discussed in either the NED or NURETH-11 papers. On the other hand, Shripad Revankar ("Revankar") was directly involved in the data processing and analyses of tritium emanation. Butt, as an author, was likewise involved in several significant aspects of test cell construction, data checks, data analyses and conclusions as well as for manuscript reviews. From my experience of over 10 years in research it has been common practice to be as inclusive as possible, especially in relation to offering co-authorship, to students to help them feel appreciated and credited for their efforts, even if not as significant as those of others on the author list.

I performed experiments over 5 months at Tsoukalas' laboratory alongside Tsoukalas group members using their setup and apparatus, and resources provided by Tsoukalas. Entry-exit data logs will show Taleyarkhan was seldom present during the time I performed my experiments. Taleyarkhan played no role in the setup of the experimental system (which was different from that used by ORNL), conduct of actual experimentation, data acquisition, data transfer for post-processing, data analyses, figure generation for data display, or conclusions.

I participated in Tsoukalas' group meetings during the first half of 2004 during which updates were provided. After the G60 laboratory was asked to be vacated by Jim Schwietzer and we moved the apparatus to the INOK laboratory during May 2004, Tsoukalas visited the INOK to review progress in July 2004.

I performed tritium data monitoring and analyses for Tsoukalas' group experiments using a newly available spectrometer system, calibrated by an expert from ORNL named Michael Murray. I prepared a report and provided it to Tsoukalas' group on September 23, 2004.

I did not acknowledge Tsoukalas in my NED and NURETH-11 papers because I treated him as the Head of the School of Nuclear Engineering. As far as what I know and what I was told, Tsoukalas had no experience in sonofusion or experiments concerning sonofusion. I

requested review advice from Taleyarkhan (who was also helping other Tsoukalas group members). Tsoukalas arranged for me to receive assistance from other Tsoukalas group members if I thought I needed it or wanted it. The people from Tsoukalas' group who actually provided technical assistance were acknowledged in the NED manuscript.

I also interviewed with Emil Venere ("Venere") for the July 12, 2005 Press Release. I had no experience with press releases so Venere suggested including Taleyarkhan's participation alongside input from Tsoukalas. Tsoukalas is acknowledged for providing direction and sponsorship of the Xu et al. work as published.

Taleyarkhan was seldom present during actual experimentation for any of the data presented in the NED manuscript nor the NURETH-11 manuscript. He did not influence experimentation setup (which was different from ORNL studies); did not participate in any experimentation; did not check data acquired nor data transfers nor data presentation in graphs nor conclusions reached. I used different detector systems from those used at ORNL and performed calibrations separately.

Taleyarkhan helped others in Tsoukalas' group and was approachable. He was willing to offer review advice and to solicit review from his ex-team members. Taleyarkhan offered help to improve the presentation of my work and I asked him to help me with corrections to my manuscript for grammar and composition. He did not change or alter any data whatsoever, as he could not because he was not involved in the data acquisition process.

I sought advice for dissemination of my article from Taleyarkhan (who suggested Science first, then PRL and finally NED). PRL referees provided very difficult to understand comments (*i.e.*, do a totally different experiment than what I was writing about), so I asked Taleyarkhan for advice on how to respond. Taleyarkhan provided advice on the response which, to my knowledge, was also discussed with his ex-team members.

I drafted manuscripts and offered them electronically to Taleyarkhan for guidance as time permitted. On one or more occasions, Taleyarkhan offered revision comments for sentence structure and composition on his computer with me present. I usually offered a file prepared by me using portable transfer devices like a USB microdrive.

Taleyarkhan suggested NED, and Butt and I agreed during late January 2005. Taleyarkhan then requested feedback from NED editor Gunther Lohnert who invited the manuscript for review. Butt and I transmitted the manuscript directly to Lohnert who conducted his review and made the decision to accept the paper. Butt and I made modifications as requested.

I did not choose to include Taleyarkhan as an author because Taleyarkhan did not contribute to the technical material I was including in these two papers. His assistance along with others who contributed in a meaningful way (including J. Walter) were duly acknowledged. Over the past 4 years I have worked with Taleyarkhan, I know of the standards he uses for authorship on papers from our group. He is a hands-on person and has always maintained high standards for authorship and for every manuscript we have his name as co-author, I know for sure that he has always made direct technical contributions for the specific material being presented in the manuscript. If Taleyarkhan puts his name on a manuscript he has strived to ensure he reviews key experiments being conducted in his presence, and virtually always has strived to ensure cross-checks as a means of due diligence.

I myself obtained data on microphone signals obtained during routine test cell fabrication and testing assessments for thermal-hydraulic performance which were shown to Taleyarkhan during 9/2004. These are not sonofusion nuclear signals but general purpose data which I also did use later on in my NED and NURETH -11 papers. Taleyarkhan requested permission for use of these data for an overview lecture he was invited to offer in Japan.

I offered raw data to Taleyarkhan with permission to use the data as Taleyarkhan wished. He prepared his own plot and included it in a keynote lecture paper. I was acknowledged in the same manner as Taleyarkhan's other collaborators. I have verified that the same manuscript, if selected by the organizers, was to be directly accepted for publication in the MST journal based on what is declared in the Foreword of the Proceedings of the US-Japan Seminar held during late 2004. At that time, my NED and NURETH-11 papers were non-existent.

I did not object, nor do I have any problems with the usage of the data and the type of acknowledgment I received. Taleyarkhan did not plagiarize this data. I offered it to him voluntarily for his use.

I chose not to cooperate with a Tsoukalas/Chan Choi committee that began around February 2006 to inquire into alleged misconduct. Dr. Choi used words not uttered by me and misrepresented statements made by me (the word "jeopardize").

Because some have apparently questioned why I did not cooperate with that Tsoukalas/Choi committee, I will explain. As I said, I felt that that committee was biased, unfair, and made accusatory remarks at the outset, and I felt I should not take part in such unfairness. Specifically, I agreed to talk to Choi and others in an initial meeting set by that Tsoukalas/Choi committee. Soon after I walked in to the meeting, Frank Clikeman (the same person who had taken exception to my tritium analysis work along with that of Revankar) thrust the introductory part of my thesis at me and then my NED paper and said to the effect "explain to me why these are radically different in writing style?" At that point, I was so taken aback, that I left the committee because they were obviously trying to claim that I did not write my NED paper. I was quite upset at this committee. Besides, my English had improved dramatically from the time I first started writing my thesis paper after moving to the USA from China (i.e., which I had started writing in 2001 for the first few introductory chapters that were thrust upon me for comparison by Clikeman, compared with the final chapters in late 2003, and which I defended in February 2004).

The final report prepared by that committee was never shown to me for my review before submission, despite earlier assurances to the contrary by Choi.

I was contacted in August 2007 by Dr. Taleyarkhan to inquire whether any students would be willing to write testimonials evaluating his conduct, mentorship of students, academic ability, and scholarship over the years. I willingly helped Dr. Taleyarkhan, and was not forced to do so. I, myself, did not know whether students would be willing to write such testimonials, or what they would say. I provided those student testimonials to Dr. Taleyarkhan for his use. I was not forced to, nor did I, influence those testimonials in any way. I did not tell any of the students anything about the investigation. I myself know very little about the investigation despite the fact that I am apparently involved in it in some way. I understand that the investigation is confidential and intend to keep it that way.

During 2005 our group made sustained and diligent efforts to meet the objectives of the 2005 DARPA-UCLA grant (which was to recreate the external neutron-seeded sonofusion experiments as reported in the 2002 Science paper by Taleyarkhan et al.). Significant effort went on throughout 2005 and early 2006. The initial problem arose out of the use of the first batch of piezo-electric drivers for our acoustic chambers which, after several months still did not perform as needed and had to be returned to the suppliers. I myself engaged in discussions with the suppliers on this account. Only after the second batch of drivers were received during early 2006 were we able to start again. We were making progress until the March 1, 2006 review meeting.

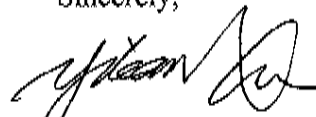
On March 1, 2006 I helped set up two experiment stations for review by the visitors. The first and main station involved experiments needed for the DARPA-UCLA project (i.e., using external neutrons). The second experiment involved self-nucleation for which Ken Suslick of University of Illinois Urbana-Champaign himself was invited to and did indeed randomly select neutron detectors for mounting on the test cells and for use as controls. He also insisted on doing the experiment in a particular way and we accommodated each of his requests during setup. At the end of the day, the detectors showed positive signatures of neutron emission as evidenced by several people in the audience. Neither I, nor anyone from Purdue engaged in misconduct of any kind and in fact went out of our way to assist the visitors engage in a successful review.

There is absolutely no truth to any of the public accusations of fabrication and fraud in relation to use of Cf-252, nor of tampering with data as reported in the sonofusion publications, especially in relation to the January 2006 PRL publication for which I was a co-author myself.

In my close to 4 years of knowing Taleyarkhan, I have never witnessed any unethical practice or research misconduct of any kind.

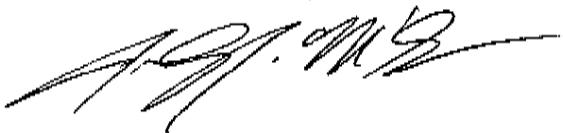
This letter, and prior letters by me, are and were completely voluntary by me, without undue influence by any outside individual(s), and they represent fair, complete, and accurate statements of fact. If there is any misunderstanding, I would like to reserve the right to make the final interpretation.

Sincerely,



Yiban Xu

*Subscribed and sworn before  
me on the 9th day of April, 2009*



COMMONWEALTH OF PENNSYLVANIA

NOTARIAL SEAL

John J. McGuigan, Notary Public  
Murrysville Boro, Westmoreland County  
My Commission Expires June 6, 2011